WARATAH
ENVIRONMENTAL CONSULTING

Remediation Action Plan

Prepared for

RTL Investments 2 Pty Ltd as trustee for RTL Marrickville Property Trust

The Timber Yards, Marrickville NSW

Waratah Environmental Consulting | WEC201.RAP_v1.0 | 16 December 2024

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Project Overview

This *Remediation Action Plan* (RAP) has been prepared on behalf of Varsity Assets Management Pty Ltd (Developer) on behalf of RTL Investments 2 Pty Ltd as trustee for RTL Marrickville Property Trust ('RTL Co.') (**the Applicant**) to support a State Significant Development Application (SSDA) for the proposed *Timberyards* development. The SSDA (SSD-76927247) seeks consent for a diverse rental housing precinct comprising build-to-rent (BTR), co-living and affordable housing. The precinct development comprises seven buildings ranging from eight to thirteen levels, with open space that includes a pocket park, through site links and communal open spaces. Specifically, consent is sought for the following:

- Site preparation (including remediation), demolition and bulk excavation for basement parking;
- Residential accommodation (shop top housing, residential flat buildings and mixed-use buildings) that includes BTR, co-living and affordable housing;
- Retail premises on the ground floor within the MU1 zoned land and extending up to 25m into the R4 zoned land;
- Publicly accessible recreation area (pocket park) and through site links;
- Neighbourhood shop (within the R4 zoned land);
- Associated landscaping and public domain works; and
- Augmentation of, and connection to, existing utilities as required.

A detailed description of the proposal is provided in the Environmental Impact assessment (EIS) by Ethos Urban. The development is declared State Significant by virtue of being a BTR development on land in Greater Sydney with an Estimated Development Cost (EDC) of greater than $50 million, with the tenanted component representing greater than 60% of the EDC (Schedule 1, *State Environmental Planning Policy (Planning Systems) 2021*).

Project vision

RTL Co. aim to deliver Sydney's premier neo-industrial residential neighbourhood - a global benchmark for imaginative urbanism. The Timberyards aims to seamlessly integrate diverse residential offerings into the distinctive character of Marrickville, fostering a sense of pride among residents and the local community. The project will deliver a wide range of rental living solutions, complemented by recreation spaces and local retail, all underpinned by Connection to Country and environmentally sustainable design principles.

Site description

The site is known as the 'Timberyards', located in Marrickville within the Inner West Local Government Area (LGA). The site comprises 39 lots with legal identification listed in the table below, and has a total area of 22,770m2 or, for the purpose of calculation of floor space, an area of 22,564m2 (excluding the SP2-zoned Victoria Road widening land, which is within the site boundary). The site is located within Precinct 47: Victoria Road in the *Marrickville Development Control Plan 2011* (MDCP 2011). The site is primarily contained in the Timber Yards sub-precinct of Precinct 47, with the lots fronting Victoria Road falling within the Victoria Road Corridor sub-precinct.

The site is approximately 700m walking distance to the newly opened Sydenham Metro Station, with 7-minute travel time to the Sydney CBD.

The site currently comprises primarily industrial and light industrial uses, with residential dwellings to a minor portion of the site on Farr Street (western boundary) and Victoria Road (eastern boundary). The site also has frontage to Sydenham Road to the south and Mitchell Street to the north (and encompassing a small lane off Mitchell Street). An aerial map is provided at **Figure 1** below.

Lot/DP	Property Address
1/724487	119A Sydenham Rd
1/972534	121 Sydenham Rd
B/439802	129 Sydenham Rd
A/439802	131 Sydenham Rd
D/377270	133 Sydenham Rd
1/700223	135 Sydenham Rd
B/343286	7 Farr St
A/304426	9 Farr St
A/304426	11 Farr St
1/78883	13 Farr St
1/252507	15 Farr St
2/252507	17 Farr St
345/587262	191 Victoria Rd

Lot/DP	Property Address
1/572829	35 Farr St
12/4590	14 Mitchell St
13/4590	10 Mitchell St
14/4590	8 Mitchell St
15/4590	183 Victoria Rd
16/4590	4 Mitchell St
17/4590	2 Mitchell St
3/4590	165 Victoria Rd
2/4590	167 Victoria Rd
1/4590	169 Victoria Rd
A/301985	171 Victoria Rd
B/301985	173 Victoria Rd
1/315293	183 Victoria Rd

Lot/DP	Property Address
3/252507	19 Farr St
4/252507	21 Farr St
5/252507	23 Farr St
6/252507	25 Farr St
7/252507	27 Farr St
8/252507	29 Farr St
9/252507	31 Farr St
1/583801	33 Farr St
C/301985	175 Victoria Rd
D/301985	183 Victoria Rd
E/301985	175 Victoria Rd
A/166330	183 Victoria Rd
20/667441	183 Victoria Rd

Figure 1 Aerial site map

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Purpose

This RAP has been prepared to address the *Secretary's Environmental Assessment Requirements* (SEARs) issued by the Department of Planning, Housing and Infrastructure (DPHI) for the subject SSDA, with specific SEAR(s) identified in the table below.

SEAR	SEAR description	Report name or report section
Remediation Action Plan **RAP**	*To provide a plan to remediate the site to a standard that presents no / acceptable risk to human health and ecological receptors both at the site and immediately adjacent the site. The remediation is to comply with the relevant acceptance criteria and sample design guidelines.*	WEC201.RAP_v1.0

Report Title	Remediation Action Plan
Project Reference Number:	WEC201.RAP_v1.0
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1. Introduction

1.1. Background

Mr. Digby Harlow of RTL Investments 2 Pty Ltd as trustee for RTL Marrickville Property Trust ('RTL Co.') engaged Waratah Environmental Consulting (Waratah) to complete Remediation Action Plan (RAP) for the proposed development at 167-169, 171-175, 183 & 191 Victoria Road; 4-8 Mitchell Street; and 7, 13 & 15-33 Farr Street, Marrickville NSW (the Site).

The subject site is located approximately 7.0 km south-west of Sydney CBD, within the Local Government Area of Inner West Council. The site is further defined as Lots 1-9 of DP252507; Lot 1 of DP583801; Lot 1 of DP572829; Lots 1-3 & 12-17 of DP4590; Lots A-E of DP301985; Lot A of DP166330; Lot 20 of DP667441; Lot 1 of DP315293; Lot 345 of DP587262; Lot 1 of DP724487; Lot 1 of DP972534; Lots A-B of DP439802; Lot D of DP377270; Lot 1 of DP700223; Lots A-B of DP304426 and Lot 1 of DP78883.

1.2. Proposed Development

Waratah understands that this RAP is required as part of a data package for submission to *NSW Department of Planning, Housing & Infrastructure* as part of a *State Significant Development Application* (SSDA) to facilitate development of the site. Based on the approved development plans (Turner Architects, 2024) Waratah understands that the site is to be redeveloped into a high-density 'build-to-rent' residence. The development involves the construction of approximately seven residential buildings with ground floor commercial, open recreational space / pedestrian thoroughfare and two levels of basement car parking (totalling 279 car spaces). The tallest residential building will extend to a total of 13 levels (RL 49.00 mAHD) with the bulk excavation level (BEL) extending to a maximum depth of 7.1 mBGL (RL 0.600 mAHD).

The footprint of each building with ground-floor commercial and any areas overlying basement car parking facilities are subject to the HIL / HSL – D (NEPC, 2013) assessment criteria; All communal / recreational open space is subject to the HIL / HSL – C (NEPC, 2013) assessment criteria; All landscaped areas / deep soil zones are subject to site-specific ecological assessment criteria; and should any student housing / residential levels be inContact with the ground level, they would be subject to the HIL / HSL – B (NEPC, 2013) assessment criteria. A copy of the proposed development plans is provided in **Appendix B**.

1.3. Remediation Objectives

The goal of the remedial works is to render the site suitable for its intended land use from a contaminated land standpoint. The remedial goals will be achieved by reducing the risk to human health and ecological receptors, to a level that meets the site acceptance criteria (SAC) as dictated by the appropriate guidelines (NEPC, 2013).

The remedial objectives are the following;

- Provide a framework for the data gap investigation and rationale to support the remedial approach;
- Provide a methodology to render the site suitable for its intended use;
- Provide a contingency plan for additional remedial works / unexpected finds;
- Outline the site management procedures to be implemented during remediation; and
- Provide an unexpected finds protocol to be implemented during the development works.

1.4. Scope of Work

The RAP was prepared in accordance with the recommendations outlined in the Detailed Site Investigation (JK Environments, 2024), compiled with the findings of the Human Health Risk Assessment (EnRiskS, 2024) and in consult with HHRA consultant. The scope of the RAP includes a review of all available environmental reports for the subject site, update the conceptual site model, identify and close applicable data gaps, and compile the RAP.

The scope of works was undertaken with reference to the National Environmental Protection Measures 1999 (Assessment of Site Contamination; amended 2013), other guidelines made under or with regards to the CLM Act (1997) and State Environmental Planning Policy Resilience and Hazards (2021).

1.5. Guidelines & Regulations

The RAP has been compiled in accordance with the following regulatory frameworks, assessment criteria and guidelines:

- CRC CARE (2013) Technical Report no.23; Petroleum hydrocarbon vapour intrusion assessment;
- CRC CARE (2013a) Technical Report no.13; Field assessment of vapours;
- Inner West Council LEP (2022);
- NSW DEC (2017) Guidelines for the NSW Site Auditor Scheme (3rd Edition);
- DCCEEW (2022) *PFAS National Environmental Management Plan*;
- Enhealth Council (2005) Management of asbestos in the non-occupational environment;
- NSW EPA (2014) Waste Classification Guidelines;
- NSW EPA (2020) *Consultant Reporting on Contaminated Land, contaminated land guidelines*;
- POEO Act (1997);
- Australian and New Zealand Environment and Conservation Council (ANZECC), 2000 *Australian and New Zealand Guidelines for fresh and marine water quality;*
- NEPC (1999) *National Environmental Protection Measures* (Assessment of Site Contamination) Schedule B1;
- NSW EPA (2020) *Underground Petroleum Storage System (UPSS) Guidelines for the protection of the environmental operations regulation 2019*; and
- US EPA (2009) *Regional Screening Levels.*

2. Site Information

2.1. Cadastral Information

Attribute	Description
Site Address	167-169, 171-175, 183 & 191 Victoria Road; 4-8 Mitchell Street; and 7, 13 & 15-33 Farr Street, Marrickville NSW
Lot / Section / Deposition Plan	Lots 1-9 of DP252507; Lot 1 of DP583801; Lot 1 of DP572829; Lots 1-3 & 12-17 of DP4590; Lots A-E of DP301985; Lot A of DP166330; Lot 20 of DP667441; Lot 1 of DP315293; Lot 345 of DP587262; Lot 1 of DP724487; Lot 1 of DP972534; Lots A-B of DP439802; Lot D of DP377270; Lot 1 of DP700223; Lots A-B of DP304426 and Lot 1 of DP78883.
Site Area	22,770 m² (https://maps.six.nsw.gov.au/#)
State Survey Marks	A total of four state survey marker (SS) and one permanent marker (PM) were identified within close proximity (<150m) to the site: - SS49218 on Farr Street; - SS47493 on Mitchell Street; - SS46888D on Victoria Road; - SS52705D on Victoria Road; and - PM58523 on Sydenham Road.
Local Government Authority	Inner West Council
Current Zoning	MU1 – Mixed use; and R4 – High density residential.
Current Land Use	The site is currently occupied by several commercial industrial lots and single level dwellings.

2.2. Environmental Parameters

Attribute	Description
Soil Landscape	Based on *NSW Soil Landscapes of Sydney 1:100,000 Sheet* (Chapman & Murphy, 1989) the site is likely underlain by soils of the Birrong (bg) fluvial soil group with alluvial sediments at depth. Soils of the Birrong fluvial group are described as deep yellow podzolic soils and yellow solodic soils on older alluvial terraces; deep solodic soils and yellow solonetz on current floodplain. Underlying sediments are derived from the Wianamatta Group parent material.
Topography	The lot is planar with a gentle to moderate slope running from the North-South of the site, consistent with adjacent Victoria Road. The high point of the site is located at the north-western corner, sloping towards the south-eastern corner.
Site Drainage	Surface water at the site is anticipated to flow, and pool toward the Southern perimeter of the site consistent with topography of the site. Site water is and run off is expected to be collected by the local stormwater system and discharge toward the Cooks River.
Regional Geology	According to Chapman & Murphy (1989) the site geology is dominated by silt and clay sized alluvial materials derived from the Wianamatta Group. The Wianamatta Group consists mostly of shale with some minor carbonaceous claystone, laminite and occasional fine to medium grain lithic sandstone.
Acid Sulfate Soil Risk	The Inner West LEP (2022) indicates the site lies on the boundary of a Class 4 and Class 2b area with regards to the ASS risk. Chapman & Murphy (1989) indicates that the site lies within an area of *Low Probability of ASS occurring ≥4m below ground level*. This report should be read in conjunction with the site-specific acid sulfate soils management plan (ASSMP).
Nearest Surface Water Feature	An unnamed stormwater canal lies approximately 800m south of the site, the canal flows towards the Cooks River, approximately 2.0km south-west of the subject site. The Cooks River is tidally influenced and considered to be a moderately disturbed marine ecosystem.

2.3. Previous Investigations

A summary of available documents has been provided below. The following reports have been considered:

- Aargus (2014) *Detailed Site Investigation;* 167-169, 171-175, 183 & 191 Victoria Road, 4-8 Mitchell Street, 7-13, 15-31 & 33 Farr Street, Marrickville NSW, dated 2014;
- Aargus (2014a) *Acid Sulfate Soils Assessment*; 167-169, 171-175, 183 & 191 Victoria Road, 4-8 Mitchell Street, 7-13, 15-31 & 33 Farr Street, Marrickville NSW, dated 2014;
- Douglas Partners (2022) *Detailed Site Investigation*; 41-47 Farr Street, Marrickville NSW; dated August 2022;
- JKE (2023) *Preliminary Site Investigation;* 167-169, 171-175, 183 & 191 Victoria Road, 4-8 Mitchell Street, 7-13, 15-31 & 33 Farr Street, Marrickville NSW, dated 2023;
- JKE (2024) *Detailed Site Investigation;* 167-169, 171-175, 183 & 191 Victoria Road, 4-8 Mitchell Street, 7-13, 15-31 & 33 Farr Street, Marrickville NSW; ref: E36478PTrpt3, dated 19 March 202; and
- EnRisk (2024) *Human Health Risk Assessment (Draft);* Timber Yards, Marrickville NSW; *ref: WAR/24/MCKVR001*, dated 28 October

Report Title	Summary
Detailed Site Investigation (DSI) Aargus, 2014	- Identified upgradient, potentially contaminating off-site land uses including smash repairer and car service centre; - Fill material was encountered between 0.4 – 1.5 mBGL; - Lead and carcinogenic PAHs were reported in soil above the human health assessment criteria; - Zinc, copper, lead and benzo(α)pyrene were reported in soils above the ecological assessment criteria; - Asbestos containing material (ACM) was detected in soils in bonded and friable condition; and - Cadmium, copper, mercury, nickel and zinc were detected in groundwater exceeding the freshwater assessment criteria.
Acid Sulfate Soils Assessment (ASSA) Aargus, 2014a	- Samples collected from four boreholes, to a maximum depth of 9.0 mBGL; - Based on the results, soils from one borehole at depths of ≥2.0 mBGL were considered to be PASS; and - PASS was considered to be present in the western portion of the site.
Detailed Site Investigation (DSI) DP, 2022	- Two above ground storage tanks for cleaning solvents were observed in the south-east corner of building 41 Farr Street. The contents of the tanks were not reported; - A fuel-related UST (2,000L) was observed in the driveway of 41 Farr Street; - Lead and carcinogenic PAHs were reported in soils above the human health assessment criteria; - Lead, copper, zinc and benzo(α)pyrene were reported in soils above the ecological site assessment criteria; - Both friable and bonded ACM was detected in fill soils; - Soil vapour sampling was limited to the installation of two vapour implants and monitoring for VOCs using a PID; and - PASS considered to be present onsite and as ASSMP is recommended.

Preliminary Site Investigation (PSI) JK Environments, 2023	JKE (2023) reviewed historic information, completed a site inspection and sampled soil from 11 boreholes and sampled groundwater from five groundwater monitoring wells. The PSI identified the following potential sources of contamination / areas of environmental concern: uncontrolled fill soils; historic use of pesticides; fuel storage in the form on an underground storage tank (UST); historic use as automotive repairer; historic use as panel beater / spray painter; present commercial activities including timber merchant; hazardous building materials; and offsite commercial activity including a dry cleaner and solvent processing. Fill material was encountered from 0.25 – 1.4 mBGL, with anthropogenic inclusions such as slag, demolition debris and ash were observed within the soil matrix. Hydrocarbon odours were observed within BH4 at depths of 0.1-0.6 mBGL.
Detailed Site Investigation (DSI) JK Environments, 2023	- Soil sampling was conducted from 35 bore hole locations; - A total of 10 (five existing and five new) groundwater monitoring bores were sampled; - Fill soils were encountered from 0.24 – 2.6 mBGL, foreign materials, slag and ash were observed within fill soil; - Hydrocarbon odours were detected in BH119 from 0.6 – 1.0 mBGL; - Friable ACM was detected within BH119, BH130 and BH134 (depth not provided); - Lead, carcinogenic PAHs, PCBs, TRH-F2 and ACM was detected in fill soils above the human health assessment criteria; - TRH-F3 was detected in soil above the management limits; - Copper, lead, nickel and zinc were detected above the ecological assessment criteria; - TCE equal to the site assessment criteria was detected in one sampling location; - TRH-F2 was detected in groundwater above the human health acceptance criteria; - Arsenic, nickel, zinc and PFOS were detected in groundwater above the ecological assessment criteria; - Traces of chlorinated volatile organic compounds (cVOCs) were detected in groundwater samples; and - There is potential for contamination to be present in the vicinity of the identified UST.
Human Health Risk Assessment (HHRA) EnRisk, 2024	Based on the available data and risk calculations undertaken for the site, and considering the identified uncertainties and guidance from Australian health authorities, it was concluded that: - Health risks to future users of the proposed development are acceptable based on guidance from national health authorities. The HHRA recommended: - Any lift pits be constructed as fully tanked (with redundancy in waterproofing) to ensure these structures remain dry for the lifetime of the development and do not create preferential pathways for the movement of TCE vapours into the basement; - Any co-living or commercial spaces (e.g building manager's office) within Ground Level be constructed as full tanked (with redundancy

in waterproofing) noting areas of groundwater seepage within these rooms are unlikely to be acceptable to future users of the proposed development; and

- The basement drainage system be entirely isolated from indoor air within the basement e.g. no strip drains behind the basement walls with the weep holes leading into the basement.

The HHRA also recommends that the need for additional groundwater and soil vapour investigations be considered in the context of the potential for site contamination and the overall project timelines. Additional contamination is often identified at potentially contaminated site following demolition and / or basement excavation, and the retrofitting of vapour mitigation and / or water proofing measures (which may be needed where additional contamination is identified during this process) can be costly.

3. Conceptual Site Model

The NEPM (NEPC, 2013) defines a CSM as a representation of the site related information regarding contamination sources, receptors and exposure pathways. The CSM for the subject site is based on the information and contamination data presented in the previous reports (refer to **Section 2.3**) and summarised in the most recent DSI (JKE, 2024).

3.1. Data Gaps

Based on a review of the previous reports (refer to **Section 2.3**), there is insufficient data to adequately characterise the lateral extent of soil vapour impacts at the site. A detailed soil vapour investigation program, in conjunction with groundwater monitoring, is to be approved by the HHRA consultant. The findings of additional soil vapour data will be used to derive site specific acceptance criteria and any applicable modifications to vapour mitigation measures.

Furthermore, the preliminary waste classification of the site (JKE, 2024) indicated that all fill soils at the site are to be classified as general solid waste as special waste (asbestos). In accordance with NEPM (2013) and the WA DoH (2009), and in an effort to meet project costing objectives, every effort will be made to minimise soil waste leaving site. In order to achieve any reduction in waste material leaving site, the fill will need to be adequately characterised and segregated into the various applicable waste streams.

Source / AOC	Migration Pathway	Transport Mechanism	Potential Receptor	Discussion
Uncontrolled imported fill soil: - Heavy metals (Cu, Pb, Ni, Zn) - TRH - PAHs - BTEXN - PCBs - OCP / OPP - ACM	Soil - Direct contact with exposed soil; and - Generation of impacted dusts / sediments.	- Dermal contact / inhalation / ingestion of impacted soil.	- Future users of the site / occupants / neighbours; - Maintenance workers; and - Construction workers.	JKE (2024) identified fill material of varying thickness, extending up to 2.6 mBGL. A number of analytes including friable ACM were detected exceeding the SAC. Lead, nickel and benzo(α)pyrene were found to be leachable and potentially contributing to contaminants detected in site groundwater.
	Groundwater - Surface runoff; and - Leaching / migration of contaminants into groundwater.	- Dermal contact / inhalation / ingestion of impacted water; and - Migration of impacted groundwater into local marine ecosystem	- Offsite ecological receptors, including Alexandra Canal aquatic ecosystem.	
Onsite UST (35 Farr Street) - Lead - TRHs - PAHs - BTEXN - cVOCs - PFAS	Soil - Direct contact with exposed soil; and - Generation of vapour.	- Dermal contact / inhalation / ingestion of impacted soil and soil vapour.	- Future users of the site / occupants / neighbours; - Maintenance workers; and - Construction workers	Samples collected in the vicinity of the UST did not exceed the SAC for contaminants associated with the storage of fuel.
	Groundwater - Leaching / migration of contaminants into groundwater; - Migration of groundwater across the site; and - Generation of potentially hazardous vapours from impacted groundwater.	- Dermal contact / inhalation / ingestion of impacted water; and - Migration of impacted groundwater into local marine ecosystem	- Offsite ecological receptors, including Alexandra Canal aquatic ecosystem.	Localised groundwater samples were found to contain TRH-F2 above the human health acceptance criteria. Furthermore, cVOCs, PFOS and heavy metals were detected above the ecological acceptance criteria.
Offsite UST (41 Farr Street) - Lead - TRHs - PAHs - BTEXN - PFAS	Soil - Direct contact with exposed soil; and - Generation of vapour.	- Dermal contact / inhalation / ingestion of impacted soil and soil vapour.	- Future users of the site / occupants / neighbours; - Maintenance workers; and - Construction workers	TCE was detected in a soil vapour sample collected adjacent the north-western boundary of the site. The source is unknown but is likely attributed to the storage of cVOCs at the neighbouring property (41 Farr Street).

	Groundwater - Leaching / migration of contaminants into groundwater; - Migration of groundwater onto the site from offsite source; and - Generation of potentially hazardous vapours from impacted groundwater.	-	Dermal contact / inhalation / ingestion of impacted water; and - Migration of impacted groundwater into local marine ecosystem	-	Future users of the site / occupants / neighbours; - Maintenance workers; - Construction workers; and - Offsite ecological receptors, including Alexandra Canal aquatic ecosystem.	
Impacted groundwater - TRH - BTEXN - cVOCs	Soil Vapour - Volatilisation of contaminants from groundwater - Accumulation of vapours beneath slabs - Migration through preferential pathways to indoor air space.	-	Inhalation of hazardous vapours	-	Future users of the site / occupants / neighbours; - Maintenance workers; and - Construction workers	Impacted groundwater presents a secondary contamination source in the form of vapour emission of contaminants associated with storage of fuel, solvents and other industrial chemicals. Volatile contaminants are emitted from groundwater and migrate along preferential pathways to accumulate in indoor airspace.
Potential ASS - Sulfidic ore	Soil Oxidisation of sulfidic ores	-	Direct contact with vegetation and building materials	Building piles and basement / ground floor slab. - Vegetation within landscape / deep soil zones.		Soil material and groundwater to be managed in accordance with the site-specific ASSMP.
	Groundwater PASS impacting groundwater	-	Acidification of groundwater entering local marine ecosystem	-	Offsite ecological receptors, including Alexandra Canal aquatic ecosystem.	
Construction of containment cell(s) - Heavy metals - PAHs	Soil - Direct contact with exposed soil; and - Generation of impacted dusts / sediments.	-	Dermal contact / inhalation / ingestion of impacted soil.	-	Maintenance workers; and - Construction workers.	Several contaminants identified by the DSI (JKE, 2024) were found to be leachable. Placing these materials beneath the groundwater table presents an

- TRH - cVOCs - ACM	Groundwater - Leaching / migration of contaminants into groundwater; - Migration of groundwater onto the site from offsite source; and - Generation of potentially hazardous vapours from impacted groundwater.	- Dermal contact / inhalation / ingestion of impacted water; and - Migration of impacted groundwater into local marine ecosystem	- Future users of the site / occupants / neighbours; - Maintenance workers; - Construction workers; and - Offsite ecological receptors, including Alexandra Canal aquatic ecosystem.	ongoing risk to groundwater conditions and offsite ecological receptors. Soil material impacted with ACM is to be managed in accordance with the AMP and adequately sealed within the containment cell. The location and design specifications of the containment cell are to be approved by the HHRA consultant.
	Soil Vapour - Preferential pathway created by interface of containment cell and surrounding soil; vapour accumulating in indoor air or sub-slab.	- Inhalation of hazardous vapours	- Future users of the site / occupants / neighbours; - Maintenance workers; and - Construction workers	The containment cell may present a preferential pathway for soil vapour; either through the permeable membrane of the cell itself or along the interface between the cell and surrounding soil matrix.

4. Remediation Options

4.1. Remediation

The NSW EPA follows the hierarchy set out in NEPM (2013) for the remediation of contaminated sites. The preferred order for soil remediation and management is as follows:

1. On-site treatment of soil so that the contaminant is either destroyed or the associated hazard is reduced to an acceptable level;
2. On-site retention of soil so that the contaminant is adequately encapsulated within a containment cell / borrow pit. The associated hazard is made safe and managed under an environmental management plan (EMP);
3. Off-site treatment of excavated material so that the contaminant is either destroyed or the associated hazard is reduced to an acceptable level, after which the soil is returned to the site;

Or if the above are not practicable:

4. Consolidation and isolation of the soil by on-site containment within a properly designed barrier; and
5. Removal of contaminated material to an approved site or facility, followed where necessary by replacement with clean material; or
6. Where the assessment indicates that remediation would have no net environmental benefit or would have a net adverse environmental effect, implementation of an appropriate management strategy.

For simplicity herein, the above hierarchy are respectively referred to as Option 1, Option 2, Option 3 etc.

The NEPM (2013) and the WA DoH (2009) guidelines prefer the following asbestos remediation hierarchy:

1. Minimisation of public risk;

2. Minimisation of contaminated soil disturbance; and

3. Minimisation of contaminated material/soil moved to landfill.

The Guidelines for the NSW Site Auditor Scheme, 3rd Edition (2017)18 provides the following additional

requirements to be taken into consideration:

Remediation should not proceed in the event that it is likely to cause a greater adverse effect than leaving the site undisturbed; and

Where there are large quantities of soil with low levels of contamination, alternative strategies should be considered or developed.

4.2. Consideration of Remediation Options

Option	Discussion	Suitability
Option 1 On-site treatment of contaminated soil	On-site treatment provides a mechanism to reuse the processed material and, in some instances, to avoid the need for large scale earthworks. Some of the treatment options include bio-remediation, soil washing, air	Given the protracted time required to treat PAH contamination, this may not be suitable for this contaminant. Soil washing may be suitable for ACM in a bonded condition.

	sparging and soil vapour extraction, thermal desorption and physical removal of bonded ACM in the absence of friable asbestos.	Soil washing is not suitable in areas where friable asbestos was detected. There are remediation options available for the onsite treatment of cVOCs, however these options are quite expensive and take several years to complete, this may not be a suitable option for this project.
Option 2 On-site retention of contaminated soil	On-site retention involves classifying, excavating and disposing of underlying 'clean' material, constructing a containment cell with the use of an appropriately impermeable material suitable for the corresponding contaminant to be contained; placing the contaminated material in the containment cell and adequately sealing	Suitable for material impacted with asbestos only. Leachable contaminants such as PAHs and lead, are not suitable ot be placed in containment cells that lie beneath the groundwater table. Furthermore, the design of the containment cells (materials used, location and depth) must be approved by the HHRA consultant.
Option 3 Off-site treatment of contaminated soil	Contaminated soils are excavated, transported to an approved/ licensed treatment facility, treated to remove/stabilise the contaminants then returned to the subject site, transported to an alternative site or disposed to an approved landfill facility. This option is contaminant-specific. The cost per tonne for transport to and from the site and for treatment is considered to be relatively high. The material would also have to be assessed in terms of suitability for reuse as part of the proposed development works under the waste and resource recovery regulatory framework.	Given the various contaminants present, it is unlikely to be economically feasible nor possible to transport the impacted material offsite, treat it such that it is rendered suitable for its intended use and then transported back to site. Similarly, with contaminated groundwater, offsite treatment is unlikely to be economically suitable for this project.
Option 4 Removal of contaminated material to an appropriate facility	Contaminated soils would be classified in accordance with NSW EPA guidelines for waste disposal, excavated and disposed of off-site to a NSW EPA licensed landfill. The material would have to meet the requirements for landfill disposal. Landfill gate fees (which may be significant) would apply in addition to transport costs.	Applicable for the contaminants identified to date.
Option 5 Consolidation and isolation of impacted soil by cap and containment	This would include the placement of an impermeable barrier such as concrete/pavers etc, or a warning barrier and non-contaminated soil material, over the existing ground surface to isolate the contaminated material within areas outside of the basement and thereby reduce the health risk to future site users. The capping and/or containment must be appropriate for the specific contaminants of concern. An ongoing Long Term Environmental Management Plan (LTEMP) would be required and site identification documentation, possibly including the Section 10.7 council planning certificate, land title or other appropriate statutory documentation, would be modified to note the presence of the contamination. This may impact upon development approval conditions	Applicable option for inert contaminants only. The DSI (JKE, 2024) found lead, nickel and benzo(α)pyrene to be leachable. In order to retain leachable contaminants onsite, the containment cell must be designed such that it is impermeable to water and placed above the highest observed groundwater level. A containment cell may be used for soil material that contains ACM but all other contaminants are below the site acceptance criteria.

	(requiring a Section 4.55 application pursuant to the *Environmental Planning and Assessment Act 1979*), place restrictions on the use of the land and limit the future potential land value.	Not a suitable strategy for groundwater contamination.
Option 6 Implementation of management strategy	Contaminated soils would be managed in such a way to reduce risks to the receptors and monitor the conditions over time so that there is an ongoing minimisation of risk. This may occur via the implementation of monitoring programs, potentially also involving capping systems.	Suitable for groundwater and soil vapour impacts. A HHRA has been compiled (EnRiskS, 2024) which recommends management strategies for VOCs, this includes but is not limited to the implementation of vapour mitigation measures within site structures (lift shafts, basements and ground level slabs).

4.3. Preferred Remediation Option & Rationale

4.3.1. Data Gap Investigation

Based on a review of the previous reports (refer to **Section 2.3**), there is insufficient data to adequately characterise the lateral extent of soil vapour impacts at the site. A detailed soil vapour / sub-slab vapour investigation will be completed in conjunction with a groundwater monitoring program. In accordance with the minimum sampling requirements outlined in CRC CARE (2009), a total of 10 additional sub-slab soil vapour (SSV) sampling locations are to be installed and sampled in accordance with TO-15 methodology. Furthermore, to provide sufficient lateral sampling resolution, the previously installed sampling locations (SV101 & SV102) are to be re-sampled. If the previously installed SSV sampling infrastructure is not in a serviceable condition, they should be re-installed. The proposed sampling locations are presented in **Appendix A**.

The findings of this portion of the DGI will be provided to the HHRA consultant and used to derive site specific acceptance criteria for soil vapour. Any exceedances of the assessment criteria may trigger the requirement for modifications to basement / ground floor vapour mitigation measures. The details of any soil vapour exceedances, modifications to construction and installation of vapour mitigation measures are to be captured in an environmental management plan (EMP).

4.3.2. Underground Storage Tanks (USTs)

At least one UST has been identified at the site (35 Farr Street), the contents and condition of the UST nor the extent of any fuel lines, has not been determined. The contents of the UST are to be pumped out by a suitably qualified contractor; the UST and associated infrastructure is to be excavated and removed for disposal at a suitably licensed waste facility. The demolition contractor must provide the applicable tipping dockets and destruction certificate for the UST. Following the removal of the UST and associated infrastructure, and any impacted fill soils, the validation consultant will sample and validate the footprint to ensure the remaining material is below the RAC.

Given that the UST presents a potential source of VOC contamination, it is recommended that UST removal / remediation is commenced as soon as practicable as it may have a positive impact on the contamination status of groundwater and soil vapour at the site.

4.3.3. Soil Material

The preliminary waste classification of the site (JKE, 2024) indicated that all fill soils at the site are to be classified as general solid waste as special waste (asbestos). In accordance with NEPM (2013) and the WA DoH (2009), and in an effort to meet project costing objectives, every effort will be made to

minimise soil waste leaving site. In order to achieve any reduction in waste material leaving site, the fill will need to be adequately characterised and segregated into the various applicable waste streams.

A combination of remedial options 4 and 5 (refer to **Section 4.2**) are likely to be adopted at the site.

The preferred option for remediation of the contaminated fill at the site is Option 3 – Removal of impacted soil by offsite disposal. Option 3 was assessed to be: technically feasible; cost and time beneficial; and in-line with the principles of ecologically sustainable development as it minimises unnecessary risk to human and ecological receptors onsite. At least one hotspot of hazardous solid waste and one hotspot of restricted solid waste were identified by the DSI (JKE, 2024). At each hotspot location, the material is to be excavated down to the top of the natural soil horizon and 5m x 5m laterally. The soil material generated from each hotspot excavation will be classified and disposed of at an appropriately licensed waste facility. The remaining footprint will be sampled and validated by the validation consultant.

The remaining fill material is to be sampled and classified in accordance with the *waste classification guidelines* (NSW EPA, 2014). Based on the DSI (JKE, 2024), the presence of ACM in a friable condition and a bonded condition has been detected in fill soils across the site. Limited information is available for the vertical distribution of ACM, a detailed waste classification sampling program will be incorporated to accurately segregate waste streams where possible. The detailed waste classification sampling will also be used to determine the suitability of material to be placed in containment cells within the site boundaries. Fill material that does not contain leachable contaminants above the RAC (namely heavy metals, PAHs, cVOCs and PCBs) may be placed within containment cells. The design, location and specifications of the containment cell(s) are to be approved by the HHRA consultant and geotechnical engineer. The disturbance of any ACM must be conducted in accordance with the site-specific AMP.

Waratah note that, Option 4 – Consolidation and isolation of impacted soil by cap and containment, may be feasible following the data gap investigation phase of works. The selected remedial option will be determined by the volume of material that does not meet the SAC and the economic feasibility of offsite disposal of material.

In the event that Option 4 is not accepted by the responsible party, the recommended remediation strategy is Option 3 – excavation and off-site disposal of the contaminated material to a licensed landfill. If Option 3 – excavation and off-site disposal of the contaminated material, is to be adopted as the preferred option, the details are to be finalised in the site validation report.

Waratah notes that there is a site-specific acid sulfate soils management plan (ASSMP) which dictates that soil material within the south-western quadrant of the site, occurring from 2.0-6.0 mBGL contains PASS and is to be suitably treated during excavation. Any containment cell(s) should be constructed away from the area containing PASS. Furthermore, PASS material should not be placed in containment cells.

4.3.4. Groundwater

The previous investigations completed at the site detected exceedances of the assessment criteria for human health and ecological receptors. The DSI (JKE, 2024) identified exceedances of the ecological assessment criteria for the presence of various heavy metals. These exceedances were considered indicative of background conditions within an urban / industrial setting, and did not require any further remedial action. Given that the likely source of hydrocarbon contamination is present in the form of an offsite source, remediation of VOCs may not be possible.

A GME will be completed in conjunction with the soil vapour assessment as part of the DGI phase of works. Any exceedances of the RAC will be reported to the HHRA consultant so that the building and vapour mitigation measures are adequate for the intended land use. A significant portion of the basement facilities will be in contact with groundwater, it is essential that the HHRA consultant approves the vapour mitigation measures including considerations made for mixed-use areas within basement / ground level areas.

4.4. Remediation Works Category, Consent & Planning

4.4.1. Consent Requirements

In accordance with State Environmental Planning Policy (Resilience and Hazards) 2021, the category of the remediation works defines whether consent is required prior to commencement. Under *SEPP 2021*, works where there is the potential for significant environmental impact are classed as *Category 1* and require consent. *Category 2* works pose a low potential for environmental impact and do not, therefore, require prior consent.

The determination for this site is outline in **table 4.1**. Based on this determination, the remediation works for the site are considered *Category 2* and will not require development consent.

Table 4.1 - Category Decision

Significant Environmental Impact	Yes / No	Category
Designated Development or State Significant Development	No	2
Critical or threatened species habitat	No	2
Impact on threatened species, population, ecological communities or their habitats	No	2
In area identified environmental significance such as scenic area, wetlands[1]	No	2
Comply with policy made under the contaminated land planning guidelines by the council	No	2
Is work ancillary to designated development	No	2

1-Environmental Significance: coastal protection, conservation or heritage conservation, habitat area, habitat protection area, habitat or wildlife corridor, environmental protection, escarpment, escarpment protection or escarpment preservation, floodway, littoral rainforest, nature reserve, scenic area or scenic protection, or wetland.

Thirty (30) days prior to commencement of site remediation, notification to the consent authority (Inner West Council) will be made by the project manager. Council has the right of intervention after that time for a breach of any relevant Act, in particular non-compliance with *SEPP 2021*. The notification will also serve as the basis for updating Council records on properties in the LGA and will:

- Be in writing;
- Provide contact details for the notice;
- Briefly describe the remediation work;
- Show why the work is considered *Category 2* remediation;
- Specify the property address and description on which the remediation is to be carried out;
- Provide a location map; and
- Provide estimates for the commencement and completion dates of the work.

4.4.2. Development Consent & Control Plans

All works must be in accordance with any specific consent conditions stipulated by the NSW Department of Planning, Industry and Environment and / or Inner West Council.

4.4.3. Planning Requirements

The appointed site remediation contractor should prepare a site-specific *Safe Work Method Statement* (SWMS) and *Construction Environmental Management Plan* (CEMP) for the project. These documents will detail human / environmental health and safety issues, as well as all measures required under Council's Development Application approval and the Inner West Development Control Plan (2022).

Any works that have the potential to disturb ACM must be completed in accordance with the site-specific asbestos management plan (AMP).

5. Remediation Goal & Criteria

5.1. Remediation Goal

The remediation goal is to make the site suitable for the proposed development (student residence with ground floor commercial overlying basement car parking), in line with SEPP 2021 and Inner West Council (former Leichhardt Council) *contaminated land management.*

5.2. Remediation Acceptance Criteria

The remediation acceptance criteria (RAC) are outlined in **Table 5.1**. These were selected from the available published guidelines that are endorsed by national or state regulatory authorities, with due consideration of the exposure scenarios that are expected for various parts of the site, the likely exposure pathways and the identified potential receptors.

Table 5.1 Assessment Criteria

Environmental Media	Adopted Assessment Criteria	Rationale
Soil	NEPM (2013) Soil HILs / HSLs; EILs / ESLs	**Soil Health-based Investigation Levels (HILs)** High density residents for students NEPC (2013) HIL-B assessment criteria for residential settings with minimal soil access. Public open space NEPC (2013) HIL-C assessment criteria for recreational space. Basement parking facilities, plant room(s) and ground level commercial The NEPC (2013) soils HIL D thresholds for commercial / industrial setting. **Soil Health-based Screening Levels (HSLs)** High density residents for students NEPC (2013) HSL-B threshold for vapour intrusion, to assess potential human health impacts from VOCs. Public open space NEPC (2013) HSL-C threshold for vapour intrusion for recreational space. Basement parking facilities, plant room(s) and ground level commercial The NEPC (2013) soils HSL D threshold for vapour intrusion in a commercial / industrial setting. **Ecological Screening Levels and Investigation Levels (ESLs / EILs)** Soil samples are assessed against the NEPM (2013) EILs for As, Cu, Cr (VI), Pb, Zn, DDT and naphthalene, which have been derived for the protection of terrestrial ecosystems. Soil samples area assessed against the NEPM (2013) ESLs for selected petroleum hydrocarbons and TRH fractions for protections of terrestrial ecosystems. EILs / ESLs are applicable to the top 2.0m of soil only. **Management Limits for Petroleum Hydrocarbons** Should the HSLs and ESLs be exceeded for the concentration of total recoverable hydrocarbons (TRH),

		soil samples would be assessed against the NEPC (2013) *Management Limits*.
	CRC CARE (2017)	**High reliability EIL for benzo(α)pyrene** The CRC CARE (2017) high reliability ecological guideline for urban residential and public open space will be adopted to assess protection of terrestrial ecosystems against benzo(α)pyrene.
Imported material	NSW EPA (2014) Waste Classification Guidelines	Material imported as general fill must only be VENM or ENM. VENM is defined in the POEO Act (1997) as material: - That has been excavated or quarried from areas that are not contaminated with manufactured chemicals, or with process residues, as a result of industrial, commercial mining or agricultural activities; - That does not contain sulfidic ores or other waste; and - Includes excavated natural material that meets such criteria for virgin excavated natural material as may be approved from time to time by a notice published in the NSW Government Gazette. ENM and recycled materials are to meet the criteria of the relevant exemption/order under which they are produced. Analytical results for VENM and other imported materials will need to be consistent with expectations for those materials. For VENM, it is expected that: - Heavy metal concentrations are to be less than the most conservative ACL concentrations for a 'residential with no access to soil (HIL-B)' exposure setting presented in Schedule B1 of the NEPM (2013); and - Organic compounds are to be less than the laboratory PQLs and asbestos to be absent. All materials imported onto the site must also be adequately assessed as being appropriate for the final use of the site. A risk-based assessment approach is to be adopted with regards to the tier 1 screening criteria presented in Schedule B1 of NEPM (2013). Aesthetics: all imported materials are to be free of staining and odours.
Groundwater	NEPM (2013) GILs for marine ecosystems; Groundwater HSLs for vapour intrusion	**Groundwater Investigation Levels (GILs) for Marine Water** NEPC (2013) provides GILs for typical, slightly to moderately disturbed aquatic ecosystems, which are based on ANZG (2018) trigger values for the 95% levels of protection of aquatic ecosystems. Waratah notes that the 99% trigger values were applied for cadmium and mercury as they are known to bioaccumulate. Given that the groundwater acceptance criteria (GAC) for petroleum hydrocarbons is below the laboratory limit of reporting (LOR); the laboratory LOR was adopted as the GAC for aquatic ecosystems (DEC, 2007). **Groundwater HSLs for Vapour Intrusion**

		NEPC (2013) groundwater HSLs for vapour intrusion were used to assess the potential impacts to future users of the site. The HSL-D thresholds were adopted for a commercial / industrial land-use setting. Given that the standing groundwater levels were less than 2m below ground level, the NEPC (2013) HSL were used as a screening tool. Any detections of potentially volatile compounds including but not limited to cVOCs, TRH and BTEX, would trigger the need for a soil vapour intrusion investigation.
	PFAS NEMP (2020)	**Interim Marine guidelines for PFAS** The PFAS NEMP includes guideline values for PFOS and PFOA in surface water for the protection of aquatic ecosystems. These are based on the technical draft default guideline values developed by the Australia and New Zealand Environment Conservation Council (ANZECC). These values will be applied to screen groundwater and surface water results. The 95% species protection values have been adopted for the assessment of potential effects due to direct toxicity, based on the potential environmental receptors. The ANZG (2018) indicate that a higher level of protection is normally applied to assess potential risks from bioaccumulation (secondary poisoning) for chemicals, such as PFAS, which bioaccumulate and bio-magnify. Given that the Alexandra Canal is a highly disturbed environment, a 90% protection would be applicable, the 95% protection is then applied for contaminants that bio-accumulate.
Soil Vapour	CRC CARE (2013)	**HSLs for Soil Vapour Intrusion** The soil vapour assessment criteria for vapours generated within the soil matrix, accumulating in the sub-slab; or indoor airspace for commercial industrial and a residential setting.
	US EPA Vapour intrusion screening levels	**HSLs for Soil Vapour Intrusion** Where nationally endorsed assessment criteria are unavailable, the US EPA vapour intrusion screening levels (VISLs) should be adopted as a screening threshold of cVOCs.

6. Remediation Details

6.1. Roles & Responsibilities

Role	Responsibility
Client / Developer	RTL Investments 2 Pty Ltd as trustee for RTL Marrickville Property Trust The client/developer is required to appoint the project team for the remediation and must provide all investigation reports and this RAP to the project manager, remediation contractor, consent authority and any other relevant parties involved in the project.
Project Manager	Neoscape The project manager is required to review all documents prepared for the project and manage the implementation of the procedures outlined in this RAP. The project manager is to take reasonable steps so that the remediation contractor and others have understood the RAP and will implement it in its totality. The project manager will review the RAP and other documents and will update the parties involved of any changes to the development or remediation sequence (in consultation with the validation consultant).
Remediation Contractor	Not yet assigned. The remediation contractor is required to review all documents prepared for the project, apply for any relevant removal licences or permits and implement the remediation requirements outlined in this RAP. The remediation contractor may also be the construction contractor. The remediation contractor is required to collect all necessary documentation associated with the remediation activities and forward this documentation onto the client, project manager and validation consultant as it becomes available. The remediation contractor is required to advise the validation consultant at key points in the remediation and validation programme, and implement various aspects of the validation plan assigned to them.
Validation Consultant	Not yet assigned. The validation consultant provides consulting advice and validation services in relation to the remediation, and prepares the site validation report to address Conditions in the Notice of Determination Approval. The validation is required to review any deviation to this RAP or in the event of unexpected finds if and when encountered during the site work. The validation consultant is required to liaise with the client, project manager and remediation contractor on all matters pertaining to the site contamination, remediation and validation.

6.2. Pre-Commencement

The project team is to have a pre-commencement meeting to discuss the sequence of remediation, and the remediation and validation tasks. The site management plan for remediation works must be reviewed by project manager and remediation contractor, and appropriate steps are to be taken to ensure the adequate implementation of the plan.

6.3. Sequence of Remedial Work

Waratah anticipate the following general sequence of work for the project (in the context of the remediation):

Step	Role / Responsibility	Procedure
1 Site Establishment	Remediation Contractor	The remediation contractor, in coordination with the builder, will establish the site fencing / hoarding, site access gates and all necessary amenities. If any ACM is to be disturbed during this phase, the remedial contractor is to erect the appropriate exclusion zone and safety control measures, as per the AMP.
	Validation Consultant	Any imported materials used (including materials used for site preparation, including a piling platform) are to be validated by the validation consultant in accordance with **Section 6.13**.
1B Demolition	Remediation Contractor	The remediation contractor is to strip out all previously identified hazardous materials, including ACM prior to conducting site-wide demolition work. Once the validation consultant has issued the applicable clearance certificate for removal of hazardous material, the remediation contractor may commence demolition of all remaining structures. Hold point: It is recommended that groundwater and soil vapour sampling be completed prior to the demolition of any slabs at the site (refer to **Section 6.6**).
	Validation Consultant	The validation consultant is to conduct clearance inspections following the removal of any identified hazardous materials.
2 Data gap closure	Remediation Contractor	The remediation contractor will survey the site including the groundwater monitoring well heads.
	Validation Consultant	The validation consultant will complete at least one GME of all existing wells, in conjunction with a detailed soil vapour investigation. The sample, analysis and quality plan (SAQP) will be formulated in collaboration with the HHRA consultant.
3 Site remediation	Remediation Contractor	Excavation and offsite disposal of all soil materials that do not meet the RAC. Waste materials are to be disposed of at a suitably licensed waste receiving facility. The remedial contractor must maintain a tracking register of all trucks and their corresponding waste disposal dockets for all material that leaves the site. The remediation contractor will excavate and remove the identified UST along with any associated fill soil. The remediation contractor will provide a copy of the tank destruction certificate to the validation consultant. The remediation contractor will excavate and dispose of any identified hotspots prior to the bulk out of site-wide fill. Following approval from the HHRA consultant, the remediation consultant may place unsuitable material in constructed containment cells (refer to **Section 6.11**).

	Validation Consultant	Site wide fill soils are designated for excavation and offsite disposal. The validation consultant is responsible for classifying and validating any identified hotspots prior to the bulk out of remaining fill soil. The validation consultant will conduct a detailed sampling program of site-wide fill soils in accordance with the *waste classification guidelines* (NSW EPA, 2014). The construction and subsequent clearance of any containment cells will be completed under the direct supervision of the validation consultant. At the completion of soil remediation works, the validation consultant will conduct validation sampling of the soil surface. Validation samples will be analysed for the COPCs, including 'double density' sampling for asbestos quantification (WADoH, 2009).
4 Site validation report	Validation Consultant	Complete a site validation report compiling all remediation activities, data gap closure, soil material import / export registers, adequate validation sampling and data quality.
	Client	The client is to make a copy of the site validation report available for council and any other necessary parties.
5 Environmental Management Plan	Validation Consultant	In the event that potential contamination remains at the site, including but not limited soil materials encapsulated within containment cells and residual soil vapour / groundwater impacts, an EMP would be required. The EMP will include the details of any constructed vapour mitigation measures, the location and construction details of any containment cells and the requirements (if any) for ongoing monitoring.
	Client	The client is responsible for making the EMP available to all relative parties including council and the site owners. As well as implementing any of the ongoing conditions set out by the EMP.

6.4. Site Establishment & Demolition

The remediation contractor is to establish on site as required to facilitate the remediation. Consideration must be given to the work sequence and extent of remediation so that the site establishment (e.g. site sheds, fencing, access points etc) does not inhibit the remediation works.

The remediation contractor is to survey the site with particular attention given to the spot heights of each groundwater monitoring bore's well head. This information is to be made available to the validation consultant and the HHRA consultant.

The hazardous building materials in the existing structures should be removed in accordance with the relevant codes and standards, followed by clearance inspection to be completed by a suitably qualified occupational hygienist.

All waste from the demolition is to be disposed to facilities that are licenced by the NSW EPA to accept the waste. The demolition contractor is to maintain adequate records and retain all documentation for such activities including:

- A summary register including details such as waste disposal dates, waste materials descriptions, disposal locations (i.e. facility details) and reconciliation of this information with waste disposal docket numbers;
- Waste tracking records and transport certificates (where waste is required to be tracked/transported in accordance with the regulations); and
- Disposal dockets for the waste. Legible dockets are to be provided for all waste materials so they can be reconciled with the register.

It is recommended that the demolition works take place after the completion of the DGI phase of works. Constructed sampling infrastructure such as groundwater monitoring bores or soil vapour pins, are fixed to already constructed slabs. Furthermore, demolition works have the potential to introduce new migration pathways for soil vapour. In order to optimise data quality, groundwater and soil vapour investigations should be completed prior to commencement of demolition within the vicinity of any hydrocarbon contamination.

6.5. UST Validation

The DSI (JKE, 2024) identified at least one UST at 35 Farr Street. Given that the UST presents a primary source of hydrocarbon groundwater, it is recommended that the UST, fuel infrastructure and associated fill, be removed as soon as practicable.

The successful remediation of the UST has the potential to improve groundwater and soil vapour conditions in the north-western portion of the site. It is therefore recommended that remediation of the UST be completed prior to conducting the DGI. The remediation contractor should engage a suitably qualified service locator to conduct a GPR scan of the area in the vicinity of the UST to ensure that there are no other, undocumented USTs in the area.

The contents of the tank are to be pumped out and disposed of at a suitably licensed waste facility. The remediation contractor will then excavate and remove the UST, stockpiling any contaminated soil on an impermeable surface (concrete hard stand or black builders' plastic) for waste classification and offsite disposal. The UST and associated infrastructure are to be disposed of at a suitably licensed waste facility and the remediation contractor must provide a copy of the tank destruction certificate to the validation consultant. The applicable tracking for all waste should be completed in accordance with **Section 6.11**.

The remaining UST footprint is to be sampled and validated by the validation consultant. A small sample will be collected from each of the walls and base, and placed in a small zip lock back. The zip lock bag will be partially sealed around the inlet to a calibrated photoionization detector (PID) and field screened for the presence of VOCs. Relatively low PID readings indicate that the corresponding wall or base is suitable for validation sample for the COPCs. Validation samples are to be collected at a rate of 1 sample from each wall ever 5m horizontally and 1m horizontally; and 1 sample per 25m^2 of the base. Once the validation consultant confirms that the remaining material within the UST footprint is below the RAC, the remediation contractor may backfill the footprint with the use of VENM material (refer to **Section 6.6**).

6.6. Data Gap Investigation

Given the cost and time associated with installing sampling infrastructure, such as groundwater monitoring bores and sub-slab soil vapour pins, it is recommended that these items be utilised for the DGI prior to the demolition of any slabs. Furthermore, from a data quality perspective, sub-slab soil vapour pins are considered to be favourable to soil vapour bores installed within the soil regolith.

Large scale excavation has the potential to drastically alter groundwater levels and flow patterns. As such, at least one additional groundwater monitoring event (GME) of all existing well must be completed prior to the commencement of any excavation works within 1m of the groundwater level. The GME will include PFAS sampling and cVOCs within the COPCs, as well as a strict QAQC program to ensure adequate decontamination of sampling equipment.

A detailed soil vapour / sub-slab vapour investigation will be completed in conjunction with a groundwater monitoring program. In accordance with the minimum sampling requirements outlined in CRC CARE (2009), a total of 10 additional sub-slab soil vapour (SSV) sampling pins are to be installed and sampled in accordance with TO-15 methodology. Furthermore, to provide sufficient lateral sampling resolution, the previously installed sampling locations (SV101 & SV102) are to be re-sampled. If the previously installed SSV sampling infrastructure is not in a serviceable condition, they should be re-installed. The proposed sampling locations are presented in **Appendix A**.

Prior to completing the final site validation report, the findings of the DGI will be provided to the HHRA consultant. The HHRA consultant will use the DGI information to recommend modification to vapour mitigations within final design of the site. Any exceedances of the RAC and modifications to the development including but not limited to vapour mitigation measures, will be captured in an Environmental Management Plan (EMP), to be compiled by the validation consultant.

6.7. Hotspot Delineation & Validation

The DSI (JKE, 2024) identified one hotspot in the vicinity of BH131 comprising hazardous solid waste and two hotspots in the vicinity of BH115 and BH118 comprising restricted solid waste. The three identified hotspots are to be removed and validated prior to the load out of the surrounding general solid waste (asbestos) material. To ensure that the hotspots can be accurately located after the demolition of site-wide slabs, it is recommended that each location is recorded by GPS or site-specific chainage.

Each hotspot is to be excavated in a 5m x 5m (with the original sampling location at the centre) square, down to the top of the natural soil horizon. The material is to then be stockpiled on an impermeable surface (concrete hardstand or black builders' plastic) for waste classification sampling. Formal waste classification certificates shall be completed in accordance with EPA (2014a) and Section 7.5.2 of the NEPM (2013). The previous investigation data should be incorporated into these reports.

For the purpose of waste classification, soils samples will be collected at a rate of 1 sample per 25 m^3 of waste soil material up to 250 m^3 (with a minimum of 3 samples). For volumes exceeding 250 m^3, samples will be collected at a rate of 1 sample per 250 m^3 (with a minimum of 10 samples). The suite of analysis will include heavy metals, TRH, PAHs, BTEX, OC / OP pesticides, PCBs and ACM. Toxicity characteristic leachate potential (TCLP) may be required.

For the purpose of soil validation, soil samples will be collected from the walls and base of each excavated hotspot at a rate of 1 sample per 5m horizontally and 1 sample per 1m vertically of each wall of each hotspot footprint; and 1 sample per 25 m^2 of the base of each hotspot footprint.

Each hotspot validation sample will be analysed for the contaminant that initially exceeded the SAC. Should any validation sample exceed the criteria prescribed for GSW, the corresponding wall or base of the hotspot footprint will be excavated an additional 2.5m and the validation sampling will be repeated until all validation samples are suitable as GSW.

6.8. Site-Wide Fill Material

The DSI (JKE, 2024) completed a preliminary waste classification of site-wide fill soils. With the exception of the identified hotspots, the entire fill soil profile is classified as General Solid Waste (GSW); as Special Waste (asbestos). Following the removal and validation of the various hotspots (**Section 6.7**), a detailed waste classification program will be completed. The detailed sampling program will assess the suitability of waste material to be placed in any containment cells, or the applicable classification for offsite disposal.

For a commercial site of 22 500 m² a total of 60 sampling locations are required to meet the minimum requirements outlined by the sample design guidelines (NSW EPA, 2020). Samples are to be collected from each sampling location at a frequency of 1 sample per 0.5 mBGL until the natural soil horizon is reached. The waste classification of the site wide fill will determine the various waste streams, including the extent of asbestos, both in a bonded and friable condition. All suspected ACM is to be managed in accordance with the site-specific AMP.

During this phase of works the remediation contractor in coordination with the validation consultant may be able to segregate waste streams (recyclable vs non-recyclable; and asbestos impacted material vs *clean* material etc.). These considerations will be factored in when designing the containment cell(s).

Once the natural soil horizon has been achieved across the excavation footprint, the validation consultant must sample and validate the soil surface. A total of 60 sampling locations would be required in accordance with the sample design guidelines (NSW EPA, 2020), with all samples analysed at a NATA accredited laboratory for the COPCs. An additional 60 sampling locations would be required to achieve 'double-density' (WA DoH, 2009) for asbestos quantification. Where natural soil surface has been validated, this data may be used in generating any applicable VENM certificates.

6.9. Acid Sulfate Soils

As per the acid sulfate soils assessment (ASSA) completed by Aargus (2014) and in accordance with the acid sulfate soils management plan (ASSMP), all material within the south-western quadrant of the site, in the vicinity of sample location BH3 (Aargus, 2014), extending from 2.0-6.0 mBGL, is classified as potential acid sulfate soils (PASS).

All PASS material identified by the ASSMP is to be suitably neutralised and treated prior to offsite disposal. Furthermore, any exposed PASS material may not remain in-situ or stockpiled without the appropriate neutralisation / treatment. The remediation contractor is to comply with the ASSMP during all excavation works.

Given the presence of PASS in the south-western quadrant of the site, this area may not be suitably for the construction of any containment cells. Additionally, PASS material is unlikely to be suitably for placement within a containment cell.

6.10. Waste Disposal & Tracking Requirements

All waste removed from the site is to be appropriately tracked and managed in accordance with the relevant regulations. The remediation contractor (and/or their nominated construction contractor) is to maintain adequate records and retain all documentation for waste disposal activities including:

- A summary register including details such as waste disposal dates, waste materials descriptions, disposal locations (i.e. facility details, including applicable NSW Environmental

Protection Licence) and reconciliation of this information with waste disposal docket numbers; and
- Waste tracking records and transport certificates (where waste is required to be tracked/transported in accordance with the regulations); and
- Disposal dockets for the waste.

Any soil waste classification documentation is to be prepared in accordance with the reporting requirements specified by the NSW EPA. Reports are to include:

- The full name, address, Australian Company Number (ACN) or Australian Business Number (ABN) of the organisation and person(s) providing the waste classification;
- Location of the site where the waste was generated, including the source site address;
- History of the material and the processes and activities that have taken place to produce the waste;
- Potential contaminating activities that may have occurred at the site where the waste was generated;
- Description of the waste, including photographs, visible signs of contamination, such as discolouration, staining, odours, etc;
- Quantity of the waste;
- Number of samples collected and analysed;
- Sampling method including pattern, depth, locations, sampling devices, procedures, and photos of the sample locations and samples;
- Contaminants tested;
- Laboratory documentation – CoC, sample receipt, laboratory report;
- All results regardless of whether they are not used in the classification process;
- Results of sample mean, sample standard deviation and the 95% upper confidence limit (UCL) where relevant;
- Brief summary of findings including discussion of results; and
- A clear statement of the classification of the waste as at the time of the report.

Copies of the documents must be forwarded to the validation consultant on completion of the remediation for inclusion in the validation report.

6.11. Construction of Containment Cells

A potential remediation strategy for the management of unsuitable fill soils is the construction of containment cell(s). The containment cell involved the classification of underlying natural material, lignin the void with a suitable membrane and placing contaminated waste soils within the containment cell. The cell is then adequately sealed with the membrane and covered with a clean filling material.

The excavation of a containment cell has the potential to introduce new migration pathways and influence groundwater conditions. Given the potential risks associated with VOC contamination at the site, the specifications and location of each containment cell must be approved by the HHRA consultant.

All of the natural soil material within the containment cell footprint is to be sampled and classified in accordance with the NSW EPA (2014) *guidelines*. The containment cell is excavated and the footprint is lined with a membrane. The membrane must be constructed of a material that is suitable for containing the applicable contaminant of concern. A fluorescent geotextile is suitable for the containment of ACM; however, a different membrane material would be required for soluble /

leachable contaminants. For this reason, it is recommended that material placed within containment cells be placed above the groundwater level, and all contaminants (with the exception of ACM) are below the RAC. In accordance with the AMP, material placed in the containment cell should be completed in layers so that the material may be compacted such that it meets the relevant geotechnical requirements. Once the containment cell is *full* of soil material, it is to be full encapsulated with the membrane (geotextile). When the cell is adequately encapsulated, a Licensed Asbestos Assessor (LAA) should be engaged to provide a clearance for the containment cells and surrounding area.

6.12. Remediation Documentation

The construction/remediation contractor must keep records and retain all documentation associated with the remediation, including but not limited to:

- Waste/surplus soil disposal dockets;
- Asbestos management documentation, including all relevant notifications, licences, clearance certificates and air monitoring reports (additional details in this regard are to be outlined in the AMP);
- Imported materials information;
- Survey details;
- Photographs of remediation works; and
- Waste tracking documentation.

Copies of the documents must be forwarded to the validation consultant on completion of the remediation for inclusion in the validation report.

Any waste movements should be documented. Copies of the documents must be forwarded to the validation consultant on completion of the remediation for inclusion in the validation report.

6.13. Imported Materials

The remediation contractor (and/or their nominated construction contractor) is to maintain for the duration of the project an imported material register. This must include a register with details of each imported material type, supplier details, summary record of where the imported materials were placed on site, importation docket numbers and a tally of quantities (separated for each import stream). Dockets for imported materials are to be provided electronically so these can be reconciled with the register.

The above information is to be provided to the validation consultant for inclusion in the validation report. It is recommended that the register be set up at the beginning of the project and provided to the validation consultant regularly so the details can be checked and any rectification of the record keeping process can occur in a timely manner. An example of the soil register is provided in **Appendix C**.

7. QAQC Program

In order to meet the data quality objective (DQOs) and conduct field investigation in accordance with industry standards set out by the *CROCL* (NSW EPA, 2020), a comprehensive quality assurance / quality control (QAQC) program is required.

The field QAQC program will include the following sampling requirements for each sampling event:

7.1. Soil

- Each sampling event will require one set of soil trip spike / trip blank to be prepared by the NATA accredited laboratory. The soil trip spike / trip blank must be stored and handled in accordance with laboratory chain of custody protocols. The soil trip spike / trip blank is stored within the sample esky to ensure all samples have been adequately chilled during transport;
- A set of sample rinsates are to be collected from each sampling event. The rinsate samples are used to validate the adequate decontamination of hand tools and drill rods, it is not suitable for use on an excavator bucket. After completion of each sampling location, the sampling equipment is to be thoroughly decontaminated with industry approved decontamination soap (Decon 90 or certified PFAS free Decon). Following decontamination, a small amount of deionised water is passed over the sampling equipment and collected in applicable sample vessels for analysis of the COPCs; and
- A set of blind inter / intra-laboratory blanks will be collected at a rate of one set per 10 primary samples. The inter / intra-laboratory blanks will be utilised to interrogate the validity and repeatability of field samples collected.

7.2. Photoionization Detector (PID)

- A calibrated PID will be used to field screen the top of groundwater monitoring bore well heads during the GME;
- The walls and base of the UST footprint are to be screened with the PID to ensure they are suitable for validation sampling;
- The PID is used to purge soil vapour sampling trains and provide indicative screening values; and
- Each sample collected during the final surface validation, is to be field screened with the PID. A *hot* reading on the PID would indicate that further remedial excavation may be required.

7.3. Soil / Sub-Slab Vapour

- Each sampling event will require a set of blind inter / intra-laboratory blanks. The inter / intra-laboratory blanks will be utilised to interrogate the validity and repeatability of field samples collected;
- To leak test each sampling point, the connection point between the vapour pin and the sample train will be placed beneath a shroud along with a rag thoroughly soaked with isobutanol. Any detections of isobutanol will indicate that the sample train has leaked and the data may be unreliable; and
- Sampling equipment is often lab provided and single-use, a rinsate program is not required for sampling this medium.

7.4. Groundwater

- Each sampling event will require one set of water trip spike / trip blank to be prepared by the NATA accredited laboratory. The water trip spike / trip blank must be stored and handled in accordance with laboratory chain of custody protocols. The water trip spike / trip blank is

stored within the sample esky to ensure all samples have been adequately chilled during transport;

- A set of sample rinsates are to be collected from each sampling event. The rinsate samples are used to validate the adequate decontamination of the pump inlet. All sampling tubes are single-use and do not require decontamination. After each sampling location, the sampling equipment is to be thoroughly decontaminated with industry approved decontamination soap (Decon 90 or certified PFAS free Decon). Following decontamination, a small amount of deionised water is passed over the sampling equipment and collected in applicable sample vessels for analysis of the COPCs;
- It is recommended that PFAS sampling be completed with a certified PFAS-free bailer; and
- A set of blind inter / intra-laboratory blanks will be collected at a rate of one set per 10 primary samples. The inter / intra-laboratory blanks will be utilised to interrogate the validity and repeatability of field samples collected.

8. Validation Plan

Validation is necessary to demonstrate that remedial measures described in this RAP have been successful and that the site is suitable for the intended land use. The validation can be staged if required, depending on the sequence of excavation. Additional validation sampling may be required based on site observations made during remediation. Site observations will also be used as a validation tool to assess the extent of site contamination.

8.1. Validation Sampling and Documentation

The validation requirements for the site are detailed below;

Aspect	Sampling	Analysis	Observations & Documentation
Survey of site levels.	NA	NA	Remediation contractor to obtain the survey as required in **Section 6.4**, including groundwater monitoring well heads.
Inspections	NA	NA	Validation consultant to carry out visual clearance inspection of building footprint following demolition.
Hotspot validation	1 sample per linear 5m and vertical 1 metre of each wall; and 1 sample per 25m² of the base	Validation of COPCs that exceed the GSW acceptance criteria	Validation consultant to complete validation sampling of the hotspot footprint. The remaining material is to be suitable for disposal as GSW. This information is to be captured in the waste tracking portion of the validation report. Final validation of the soil surface will be completed following the removal of all fill soils.
Validation of imported materials	See below	See below	See below
Imported Materials – validation of imported materials is required for any materials imported onto the site during the remediation and to the point in time that the site validation report is prepared (e.g. gravel for site preparation, basecourse, landscaping materials, VENM, backfill for service trenches, material used for capping layers etc).			
Imported VENM backfill (if required)	Minimum of three samples per source. Additional sampling may be required at the validation consultant's discretion based on robustness of supplier documentation / VENM report	Heavy metals TRH/BTEX, PAHs, OCPs, OPPs PCBs and Asbestos	VENM documentation/report required from the remediation contractor. The documentation/report must be provided to the validation consultant prior to importation to the site. The provided documentation/report should include source site history to demonstrate analytes are appropriate. Photographs of the VENM at the source site. The VENM is to be inspected upon importation by the validation consultant to confirm it is free of visible/olfactory indicators of contamination and is consistent with documentation.

			Photographic documentation and an inspection log are to be maintained. Where check sampling occurs by the validation consultant due to deficiencies or irregularities in existing VENM documentation, the following is required: Date of sampling and description of material sampled; An estimate of the volume of material imported at the time of sampling; Sample location plan; and Analytical reports and tabulated results with comparison to the site acceptance criteria (RAC).
UST validation	1 sample per linear 5m and vertical 1 metre of each wall; and 1 sample per 25m² of the base	Validation of COPCs including TRH, PAH, lead and cVOCs.	Validation consultant to complete validation sampling of the UST footprint. The remaining material is to be below the RAC. The tank destruction certificate, waste tracking and validation samples are to be captured in the final site validation report.
Final soil validation	A total of 120 sampling locations (60 asbestos only, 60 full suite)	Validation of natural soil surface (or bulk excavation leve), full suite of COPCs including ACM quantification.	Validation consultant to collect final site validation samples including field asbestos quantification screening. All natural soil validation data to be capture in the final site validation report.
Groundwater / Soil vapour	To be determined		The validation consultant will work in conjunction with the HHRA consultant to formulate a sampling plan and acceptance criteria for the VOC risk the site. In the event that contamination remains present at the site and EMP would be required to be completed by the validation consultant.

8.2. Validation Report

As part of the validation process a site validation report will be prepared on completion of remediation and validation by the validation consultant. The report will outline the remediation work undertaken at the site and any deviations to the remediation strategy. The report will present the results of the validation assessment and will be prepared in accordance with the Reporting Guidelines (CROCL, 2020). The validation report should draw conclusions regarding the success of the remediation/validation and the suitability of the site for the proposed development (from a contamination viewpoint) in accordance with the assessment criteria provided in **Section 5.2**.

8.3. Data Quality

Data Quality Objectives (DQOs) and Data Quality Indicators (DQIs) must be clearly outlined and assessed as part of the validation process. A framework for the DQO and DQI process is outlined below

and should be reflected in the validation report. DQOs should be established for the validation with regards to the seven-step process outlined in the NEPM (2013). The seven steps include the following:

- State the problem;
- Identify the decisions/goal of the study;
- Identify information inputs;
- Define the study boundary;
- Develop the analytical approach/decision rule;
- Specify the performance/acceptance criteria; and
- Optimise the design for obtaining the data.

DQIs are to be assessed based on field and laboratory considerations for precision, accuracy, representativeness, completeness and comparability.

9. Contingency Plan

A review of the proposed remediation works has indicated that the greatest risks that may affect the success of the remediation include identification of unexpected finds and continued migration of impacted groundwater associated with both onsite and offsite commercial practices. Contingency plans to address these risks are outlined below, in conjunction with a selection of other contingencies that may apply to this project.

9.1. Unexpected Finds

Residual hazards that may exist at the site would generally be expected to be detectable through visual or olfactory means. At this site, these types of hazards may include: underground tanks and odorous or stained hydrocarbon impacted soils; or ACM. The procedure to be followed in the event of an unexpected find is presented below:

- In the event of an unexpected find, all work in the immediate vicinity should cease and the client should be contacted immediately;
- Temporary barriers should be erected to isolate the area from access to the public and workers;
- The client should engage the validation consultant to attend the site and assess the extent of remediation that may be required and/or adequately characterise the contamination in order to allow for remediation of the medium;
- In the event additional remediation is required, the procedures outlined within this report should be adopted where appropriate;
- An additional sampling and analytical rationale should be established by the consultant and should be implemented with reference to the relevant guideline documents; and
- Appropriate validation sampling should be undertaken and the results should be included in the validation report.

9.2. Importation Failure for Imported Materials

Where material to be imported onto the site does not meet the importation acceptance criteria detailed in **Section 6.2**, the only option is to not accept the material. Alternative material must be sourced that meets the importation requirements. For this reason, any material to be imported to the site should be appropriately validated prior to receiving at the subject site. In the event that unsuitable material is placed at the site, the material will need to be excavated, classified and removed from the site with subsequent validation required.

9.3. Validation Sampling and Documentation

As a minimum, the following validation sampling and documentation will be required:

- One sample per 25m² of the base of the excavation (i.e. on a 5m x 5m grid), with additional samples targeting any areas where fill removal does not appear adequate;
- Any exposed soil at the excavation walls should be sampled every 5m lineal and every fill profile (with a minimum of one sample per 1m vertical of fill);
- The final sitewide validation requires a total of 60 sampling locations to comply with the requirements outline by the NSW EPA (2020), with an additional 60 sampling locations to meet the ‘double density’ requirements for asbestos quantification (WA DoH, 2009);
- Validation samples are to be analysed for the contaminant of concern. If asbestos is identified/suspected, the validation samples are to include bulk (10L) field quantification and laboratory 500mL) samples;

- As a minimum, validation records are to include:
    - Visual observations to confirm the fill removal is acceptable;
    - Photographs to be taken;
    - Samples to be screened using a PID;
    - Observations of staining and odour to be recorded;
    - Disposal dockets to be retained and forwarded to the validation consultant for inclusion in the validation report; and
    - Any asbestos-specific requirements (air monitoring results, clearance inspections), as relevant.
- Analytical results for the contaminants of concern are to be below the RAC (detailed in **Section 5.2**) for soils presented in Schedule B(1) of the NEPM (2013), as applicable. The HSLs are to assume a depth interval of 0-1m and a sandy clay-type soil;
- Analytical results for the contaminants of concern are to be below the EIL for a residential exposure scenario. The EILs for selected metals are to be calculated based on the ABC and ACL values presented in the validation report;
- Analytical results for the contaminants of concern are to be below the ESL criteria for commercial/industrial exposure scenario, adopting a 'coarse' type soil;
- Analytical results for AF/FA in soil are to be <0.001%w/w, based on the RAC (detailed in **Section 5.2**) for soil presented in schedule B(1) of the NEPM (2013);
- Analytical results for ACM in soil are to be <0.05%w/w based on the RAC (detailed in **Section 5.2**) for soil presented in schedule B(1) of the NEPM (2013); and
- No visible FCF at the site surface and/or within the base of exposed excavations.

The EIL/ESL criteria are only applicable to the top 2m of soil within unpaved/landscaped areas, if included.

9.4. Vapour Mitigation Measures

The final site layout is to be provided to the HHRA consultant for approval. Any new information that comes to light during the DGI that alter the contamination status of the site in anyway, would require modification to vapour mitigation measures. It is imperative that an accurate model of VOC impacts at the site is gathered as soon as possible. Retrofitting structures with vapour mitigation measures can be a very costly and time extensive exercise.

10. Site Management

The information outlined in this section of the RAP is for the remediation work only. The client should make reference to the development consent for specific site management requirements for the overall development of the site.

A Construction Environmental Management Plan (CEMP) is recommended for the construction works. The CEMP should capture relevant information documented in this RAP for consistency, where applicable.

10.1. Health & Safety Plan

A site specific WHS plan should be prepared by the contractor for all work to be undertaken at the site. The WHS plan should meet all the requirements outlined in SafeWork NSW WHS regulations.

At a minimum requirement, personnel must wear appropriate protective clothing, including long sleeve shirts, dust masks/respirators, long trousers, steel cap boots and hard hats. Washroom and lunchroom facilities should also be provided to allow workers to remove potential contamination from their hands and clothing prior to eating or drinking.

10.2. Relevant Management Plans

In addition to the requirements outline in this RAP, all ACM at the site must be managed in accordance with the AMP. Furthermore, all soil material in the south-western quadrant of the site occurring from 2.0-6.0 mBGL, are to be managed in accordance with the ASSMP.

11. Conclusion

Mr. Digby Harlow of RTL Investments 2 Pty Ltd as trustee for RTL Marrickville Property Trust engaged Waratah Environmental Consulting (Waratah) to complete Remediation Action Plan (RAP) for the proposed development at 167-169, 171-175, 183 & 191 Victoria Road; 4-8 Mitchell Street; and 7, 13 & 15-33 Farr Street, Marrickville NSW (the Site).

The DSI (JKE, 2024) found exceedance of the site acceptance criteria for the presence of heavy metals, PFAS, PAHs and VOCs in groundwater contributing to an unacceptable level of risk to human health and ecological receptors both on and offsite. A preliminary HHRA has been completed by EnRiskS (2024), which indicated the need for vapour mitigation measures and an environmental management plan.

A DGI is required to adequately characterise the VOC risk to future occupants of the site. The validation consultant is to work in conjunction with the HHRA consultant to formulate the SAQP during the DGI. A revision to this RAP or separate SAQP may be required for the DGI.

At least one underground storage tank was identified at the site (35 Farr Street). The area in the vicinity of the UST should be scanned by a suitably qualified service locator to ensure that there are no additional USTs or infrastructure. The contents of the tank will be pumped out and disposed of at a suitably licensed waste facility. The UST and any associated contaminated soil are to be excavated and disposed of, with applicable destruction certificate and waste tracking information provided to the validation consultant. The remaining footprint is to be validated and backfilled with suitable VENM material.

A total of one hotspot containing hazardous solid waste (asbestos) and two hotspots of restricted solid waste (asbestos) were identified within the proposed excavation footprint. These hotspots are to be removed and validated prior to the bulk out of site-wide fill.

All fill soils within the basement excavation footprint are to be classified in accordance with the *waste classification guidelines* (NSW EPA, 2014). During this phase the validation consultant, in coordination with the remediation contractor, may be able to segregate various waste streams (containing asbestos vs not containing asbestos; recyclable vs non-recyclable etc.). For the duration of the project, the remediation contractor is to track all truckloads of soil waste leaving the site and imported material.

All excavation works are to be conducted in accordance with the site-specific AMP and ASSMP.

It may be desirable for the onsite retention of waste material with the use of containment cells. Excavation / construction of containment cells present a potential preferential pathway for soil vapour. Therefore, the construction of any containment cells and their locations, must be approved by the HHRA consultant. Furthermore, given the large-scale disturbance of ground conditions, it is recommended that the containment cells be approved by a geotechnical engineer.

Following the excavation of fill soils / bulk excavation, the remaining soil surface will be sampled and validated. The remaining soil surface must meet the RAC, with any containment cells adequately sealed and cleared by a licensed asbestos assessor.

A site validation report is to be prepared on completion of remediation activities and submitted to the consent authority to demonstrate that the site is suitable for the proposed development. In the event that any medium cannot be remediated such that it meets the remediation acceptance criteria, an Environmental Management Plan (EMP) would be required. The EMP will detail the maintenance and

management requirements to ensure the safety of future occupants and ecological receptors for the lifetime of the site.

11.1. Regulatory Requirements

Guideline / Legislation	Details
Resilience and Hazards SEPP	Under the Resilience and Hazards SEPP, site remediation can fall under Category 1 or Category 2 remediation works. In our opinion the remediation will fall within Category 2. However, the client should consult the project planner to confirm the remediation category prior to commencement of works. Development consent is not required for Category 2 remediation works; however, the consent authority should be given 30 days' notice prior to commencement of works. Under Clause 4.14 of Resilience and Hazards SEPP, a notice of completion of remediation work is to be given to council within 30 days of completion of the work. The notice of completion of remediation works must be in accordance with Clause 4.15 of Resilience and Hazards SEPP.
Duty to Report Contamination	There is currently no requirement to notify NSW EPA of site contamination, this requirement should be reassessed should remedial goals not be met.
POEO Regulations (2014) *Waste*	Part 7 of the POEO Waste Regulation 2014 set outs the requirements for the transportation and management of asbestos waste and Clause 79 of the POEO Waste Regulation requires waste transporters to provide information to the NSW EPA regarding the movement of any load in NSW of more than 10 square meters of asbestos sheeting, or 100 kilograms of asbestos waste. To fulfil these legal obligations, asbestos waste transporters must use WasteLocate. Clause 78 of the POEO Waste Regulation requires that a person who transport asbestos waste must ensure that: - Any part of any vehicle in which the person transports the waste is covered, and leakproof, during the transportation; - If the waste consists of bonded asbestos material—it is securely packaged during the transportation; - If the waste consists of friable asbestos material—it is kept in a sealed container during transportation; and - If the waste consists of asbestos-contaminated soils—it is wetted down. Asbestos waste in any form cannot be re-used or recycled.

12. Statement of Limitations

This report has been prepared for the sole use of the client (defined above). Waratah take no responsibility for the use of this document by any third party. This report does not provide any legal advice and has been prepared under the direct instructions of the client.

Waratah accepts no liability for the incorrect implementation of recommendations made in this report.

Should any suspected hazardous materials be encountered at any stage of the development, a suitably qualified environmental scientist should be engaged to manage the unexpected find.

This report should be read in its entirety, this report should not be separated or read in part as this has the potential to affect the findings of the report.

This report has been prepared by a suitably trained professional with a degree of care and diligence considered to be in conjunction with industry standards. Waratah, however, does not accept any responsibility or liability for the loss, damage, injury or death suffered by any party arising from the use of this report.

This report has been developed to guide the construction process, Waratah does not accept any liability for the quality or standard of work produced by any third party throughout the duration of this project.

References

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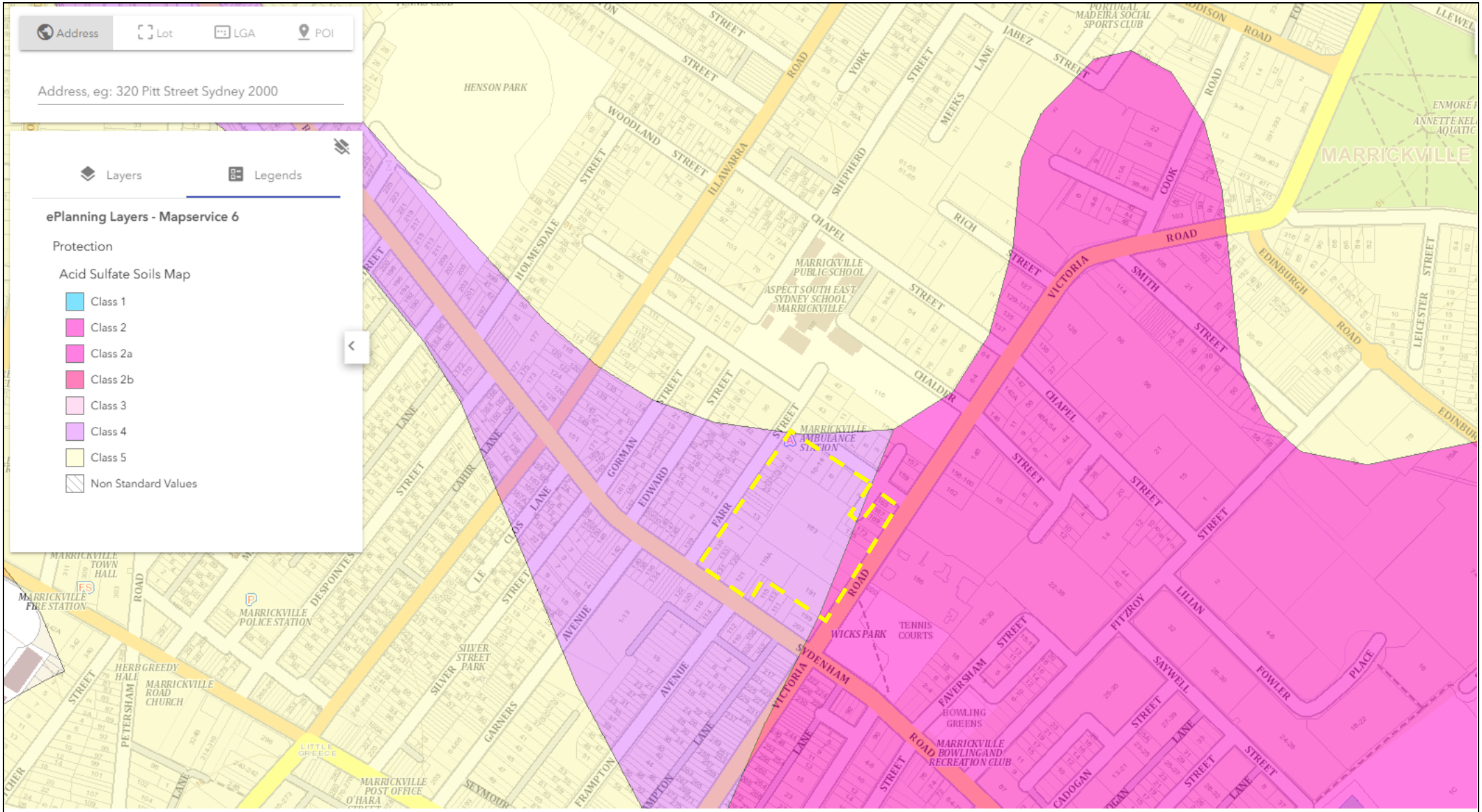
Abbreviations

ACM	Asbestos Containing Material
ASS	Acid Sulfate Soils
ANZECC	Australian & New Zealand Environment Conservation Council
ARMCANZ	Agriculture & Resource Management Council of Australia & New Zealand
B(α)P	Benzo(α)pyrene
BH	Borehole
BTEX	Benzene, Toluene, Ethylbenzene, Xylenes
CoC	Chain of Custody
cVOC	Chlorinated volatile organic compound
DA	Development Application
DECC	Department of Environment & Climate Change (see OEH)
DECCW	Department of Environment &Climate Change & Water (see OEH)
DNAPL	Dense non-aqueous phase liquid
DO	Dissolved Oxygen
DP	Deposited Plan
EC	Electrical Conductivity
EIL	Environmental Investigation Level
ENM	Excavated Natural Material
EPA	Environmental Protection Authority
ESA	Environmental Site Assessment
ESL	Environmental Screening Level
GAC	Groundwater Assessment Criteria
GIL	Groundwater Investigation Level
GME	Groundwater Monitoring Event
HIL	Health-based Investigation Level
HM	Heavy Metals
HSL	Health-based Screening Levels
Km	Kilometre
LNAPL	Light non-aqueous phase liquid
LOR	Limit of report
mAHD	metres Australian Height Datum
mBGL	metres below ground level
mg/L	Milligrams per litre
µg/L	Micrograms per litre
mV	Millivolts
NATA	National Association of Testing Authorities, Australia
NEPC	National Environmental Protection Council
NEPM	National Environmental Protection Measures
NSW	New South Wales
OCP	Organochlorine pesticides
OEH	Office of Environment and Heritage
OPP	Organophosphorus pesticides
PAHs	Polycyclic Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyls
pH	per Hydrogen (measurement of acidity / alkalinity)
PQL	Practical Quantitation Limit
QAQC	Quality Assurance / Quality Control

RAP	Remedial Action Plan
SAC	Soil Assessment Criteria
SAQP	Sample, Analysis & Quality Plan
SIL	Soil Investigation Level
SRA	Sample Receipt Advice
SWL	Standing Water Level
TDS	Total dissolved solids
TCLP	Toxicity Characteristics Leachate Procedure
TRH	Total recoverable hydrocarbons
UCL	Upper Confidence Limit
USEPA	United State Environmental Protection Agency
UPSS	Underground Petroleum Storage System
UST	Underground Storage Tank
VENM	Virgin Excavated Natural Material
VOCs	Volatile organic compounds
WADOH	Western Australia Department of Health

Appendix A – Figures



Site boundary

*All locations are approximate

Scape

Timber Yards, Marrickville NSW

Figure 1 –ASS Risk Map

Scale: 1: 10 000

N

WARATAH
ENVIRONMENTAL CONSULTING

Site boundary

Proposed soil vapour sampling location

Existing soil vapour sampling location

*All locations are approximate

RTL Co

Timber Yards, Marrickville NSW

Figure 2 –Soil Vapour Sampling location

Scale: 1: 2000

N

WARATAH
ENVIRONMENTAL CONSULTING

Site boundary

Sample location (Aargus, 2014)

ASS management area

*All locations are approximate

RTL Co

Timber Yards, Marrickville NSW

Figure 2 –ASS Management Area

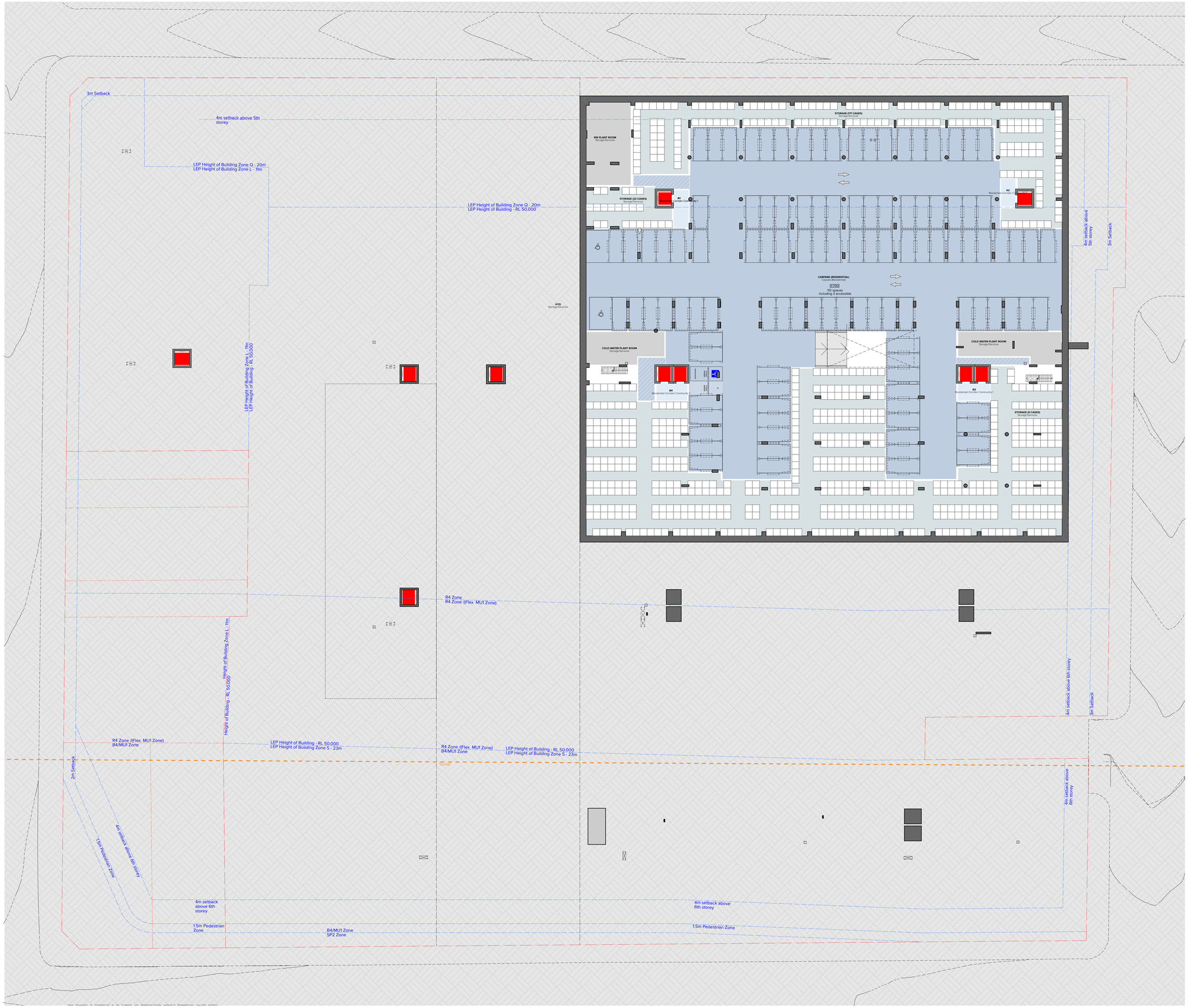
Scale: 1: 2000

N

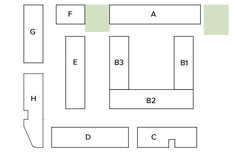
WARATAH

ENVIRONMENTAL CONSULTING

Appendix B – Development Plans



Key Plan



Notes

Rev	Date	Approved by	Change ID	Change Note
G	04.09.24	JF		
F	29.08.24	JF		
E	26.08.24	JF		

Collaborating Design Team

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Aileen Sage

MATTHEW PULLINGER ARCHITECT

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YERRABINGIN

Left Bank Co.

Project Manager

neoscape

Client

RTLCo

Project Title

Marrickville Timber Yards

Lots bound by Victoria Road, Sydenham Road, Farr Street and Mitchell Street, Marrickville NSW 2204

Drawing Title

GA Plans

Basement 01

Status	Project No.	Rev
For Information	23068	G

Scale: **1:250 @ B1**

Dwg No.: DA-110-006

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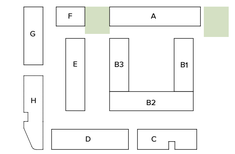
DLCS Quality Endorsed Company: ISO 9001:2015, Registration Number 20476
Nominated Architect: Nicholas Turner 6906, ABN 86 064 084 811

Key Plan



Notes

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F	29.08.24	JF		
E	26.08.24	JF		
D	12.08.24	JF		

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Project Manager

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RTL Co

Project Title

Marrickville Timber Yards

Lots bound by Victoria Road, Sydenham Road, Farr Street and Mitchell Street, Marrickville NSW 2204

Drawing Title

GA Plans

Ground Level - Victoria Road

Status	Project No.	Rev
For Information	23068	G

Scale **1:250 @ B1**

Dwg No. DA-110-007

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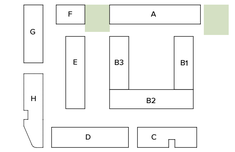
DLCG Quality Endorsed Company: ISO 9001:2015, Registration Number 20476
Nominated Architect: Nicholas Turner 6686, ABN 86 064 084 871

Key Plan



Notes

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G	04.09.24	JF		
F	29.08.24	JF		
E	26.08.24	JF		
D	12.08.24	JF		

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Project Manager

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RTLco

Project Title

Marrickville Timber Yards

Lots bound by Victoria Road, Sydenham Road, Farr Street and Mitchell Street, Marrickville NSW 2204

Drawing Title

GA Plans

Upper Ground Level - Farr Street

Status	Project No.	Rev
For Information	23068	G

Scale **1:250 @ B1**

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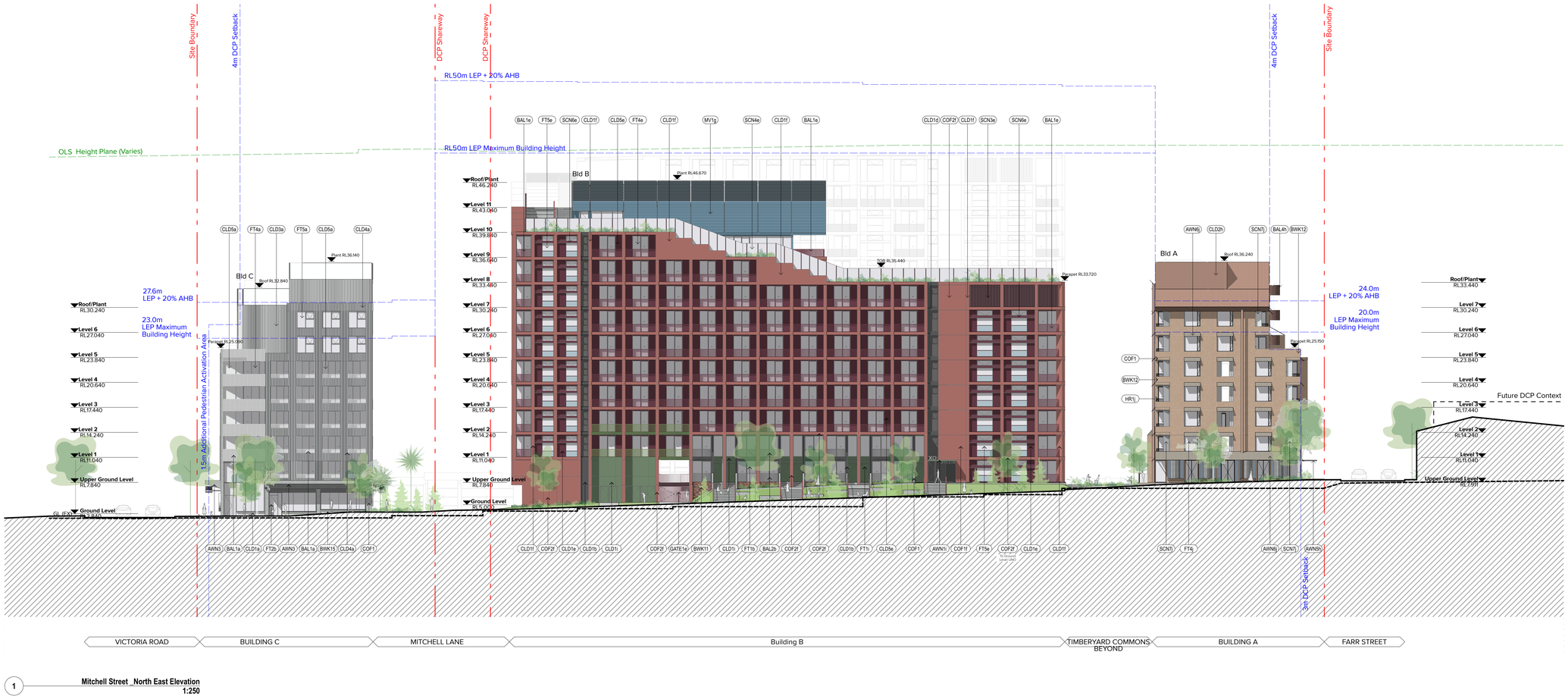
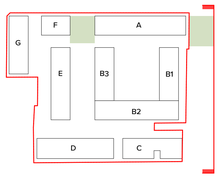
QLCS Quality Endorsed Company. ISO 9001:2015. Registration Number 20476
Nominated Architect: Nicholas Turner 6808, ABN 86 064 084 911



1 **Mitchell Street _North East Elevation**
1:250

Key Plan



Notes

Refer to Precinct Material & Finishes Board drawing DA-890-001 for codes and definitions.

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1	12.12.24	DS	For SSDA Submission

Collaborating Design Team

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neoscape

Client

RTL Co.

Project Title

The Timberyards by RTL Co.

Lots bound by Victoria Road, Sydenham Road, Farr Street and Mitchell Street, Marrickville NSW 2204

Drawing Title

GA Elevations

Mitchell Street_North East Elevation

Status	Project No.	Rev
For SSDA Submission	23068	1

Scale **1:250 @ B1**

Dwg No. DA-210-201

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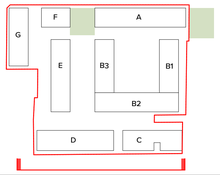
DLCS Quality Endorsed Company: ISO 9001:2015, Registration Number 20476
Nominated Architect: Nicholas Turner 4686, ABN 86 084 084 911

1 **Victoria Road _ South East Elevation**
1:250

Key Plan



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Rev	Date	Approved by	Change Note

Collaborating Design Team

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RTLco

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The Timberyards by RTL Co.

Lots bound by Victoria Road, Sydenham Road, Farr Street and Mitchell Street, Marrickville NSW 2204

Drawing Title

GA Elevations
Victoria Road_South East Elevation

Status	Project No.	Rev
For SSDA Submission	23068	1

Scale
1:250 @ B1

Dwg No.
DA-210-301

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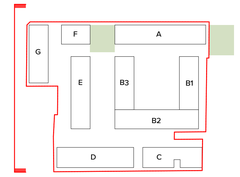
Nominated Architect: Nicholas Turner 6690, ABN 86 064 084 911

1 **Sydenham Road _South West Elevation**
1:250

Key Plan



Notes

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1	12.12.24	DS	For SSDA Submission

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RTL Co.

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Drawing Title

GA Elevations

Sydenham Road_South West Elevation

Status	Project No.	Rev
For SSDA Submission	23068	1

Scale	Dwg No.
1:250 @ B1	DA-210-401

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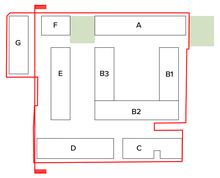
DLCS Quality Endorsed Company ISO 9001:2015, Registration Number 20476
Nominated Architect: Nicholas Turner 6608, ABN 86 064 084 911

1 **Residential Mews_South West Elevation**
1:250

Key Plan



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Project Title

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Lots bound by Victoria Road, Sydenham Road, Farr Street and Mitchell Street, Marrickville NSW 2204

Drawing Title

Internal Elevations
Residential Mews_South West Elevatio

Status	Project No.	Rev
For SSDA Submission	23068	1

Scale
1:250 @ B1

Dwg No.
DA-220-201

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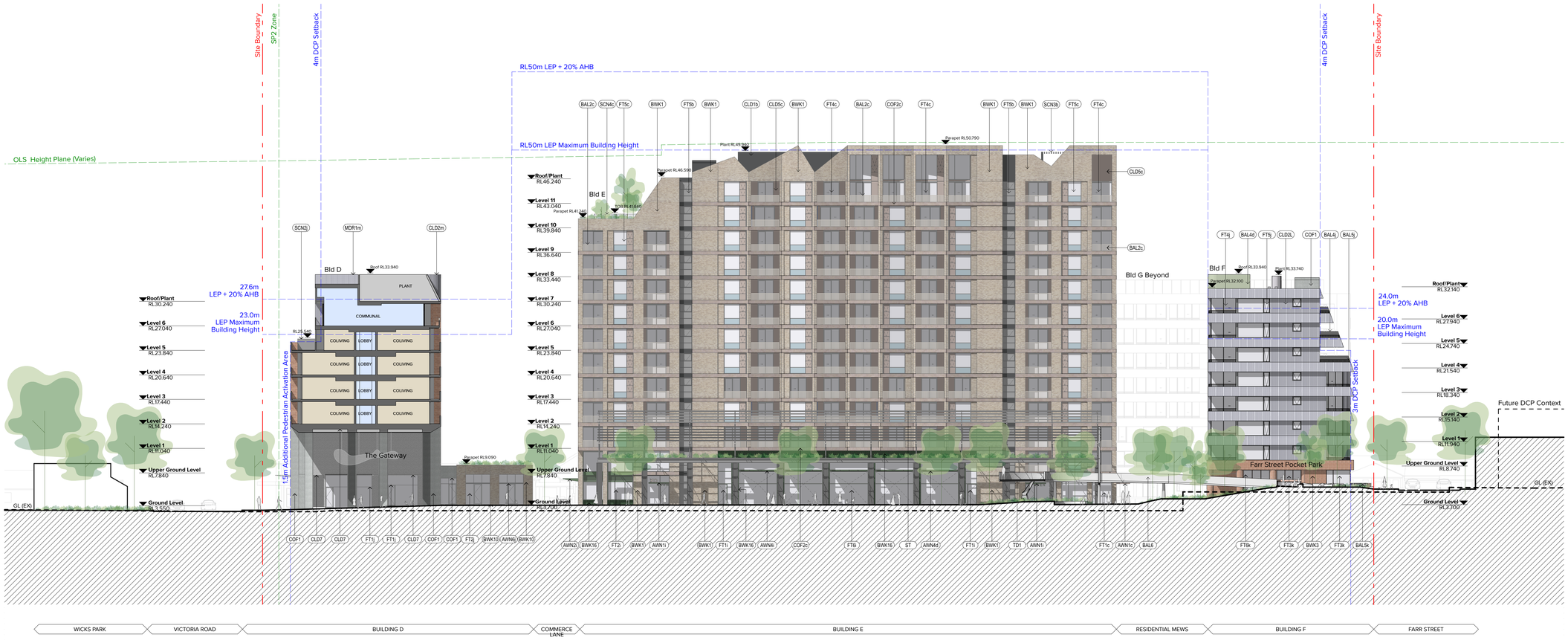
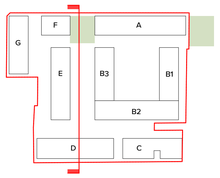
Nominated Architect Nicholas Turner 6606, ABN 86 064 084 911



1 **Warehouse Place_North East Elevation**
1:250

Key Plan



Notes

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Project Title

The Timberyards by RTL Co.

Lots bound by Victoria Road, Sydenham Road, Farr Street and Mitchell Street, Marrickville NSW 2204

Drawing Title

Internal Elevations

Warehouse Place_North East Elevation

Status	Project No.	Rev
For SSDA Submission	23068	1

Scale **1:250 @ B1**

Dwg No. DA-220-301

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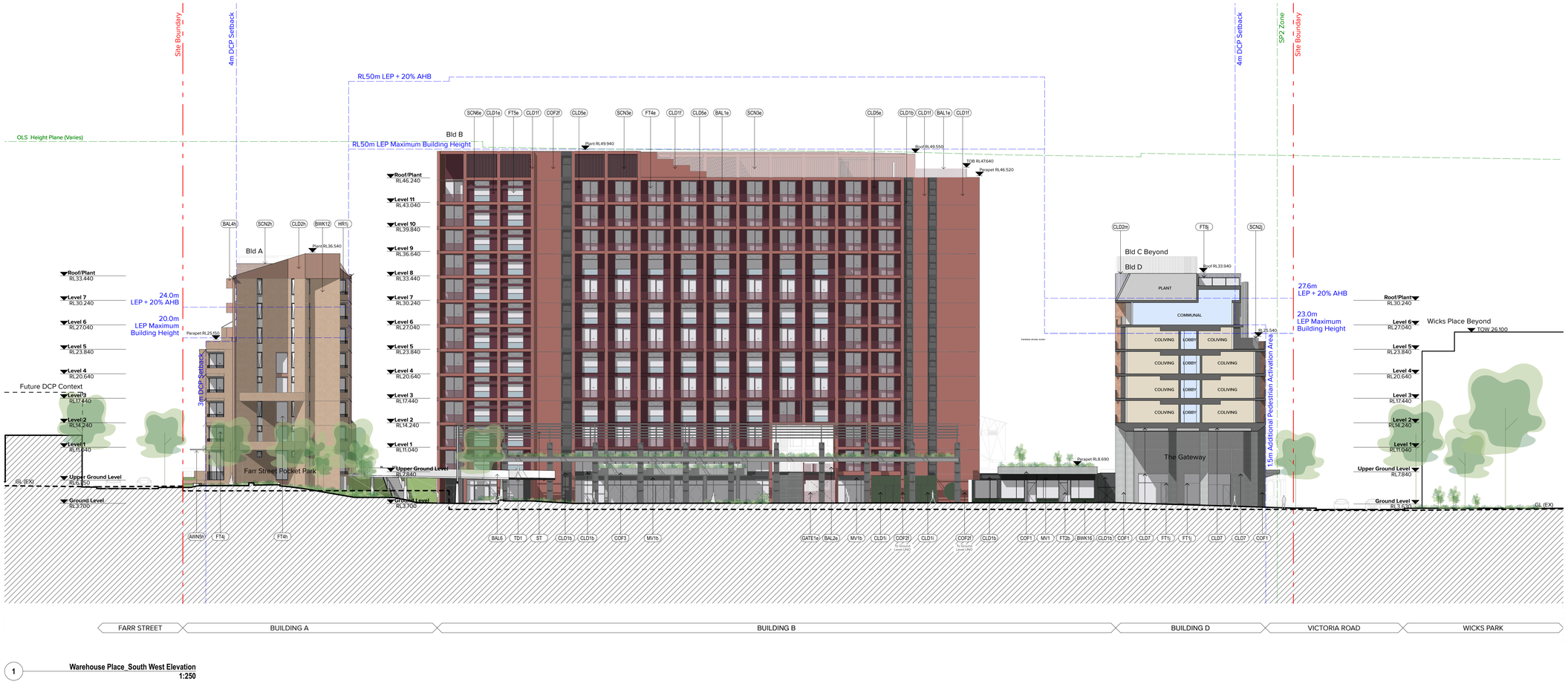
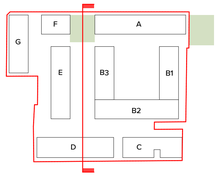
DLCG Quality Endorsed Company. ISO 9001:2015, Registration Number 20476
Nominated Architect: Nicholas Turner 6689, ABN 86 064 084 811



1 **Warehouse Place_South West Elevation**
1:250

Key Plan



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Collaborating Design Team

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Aileen Sage

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neoscape

Client

RTLCo

Project Title

The Timberyards by RTL Co.

Lots bound by Victoria Road, Sydenham Road, Farr Street and Mitchell Street, Marrickville NSW 2204

Drawing Title

Internal Elevations
Warehouse Place_South West Elevatio

Status	Project No.	Rev
For SSDA Submission	23068	1

Scale
1:250 @ B1

Dwg No.
DA-220-401

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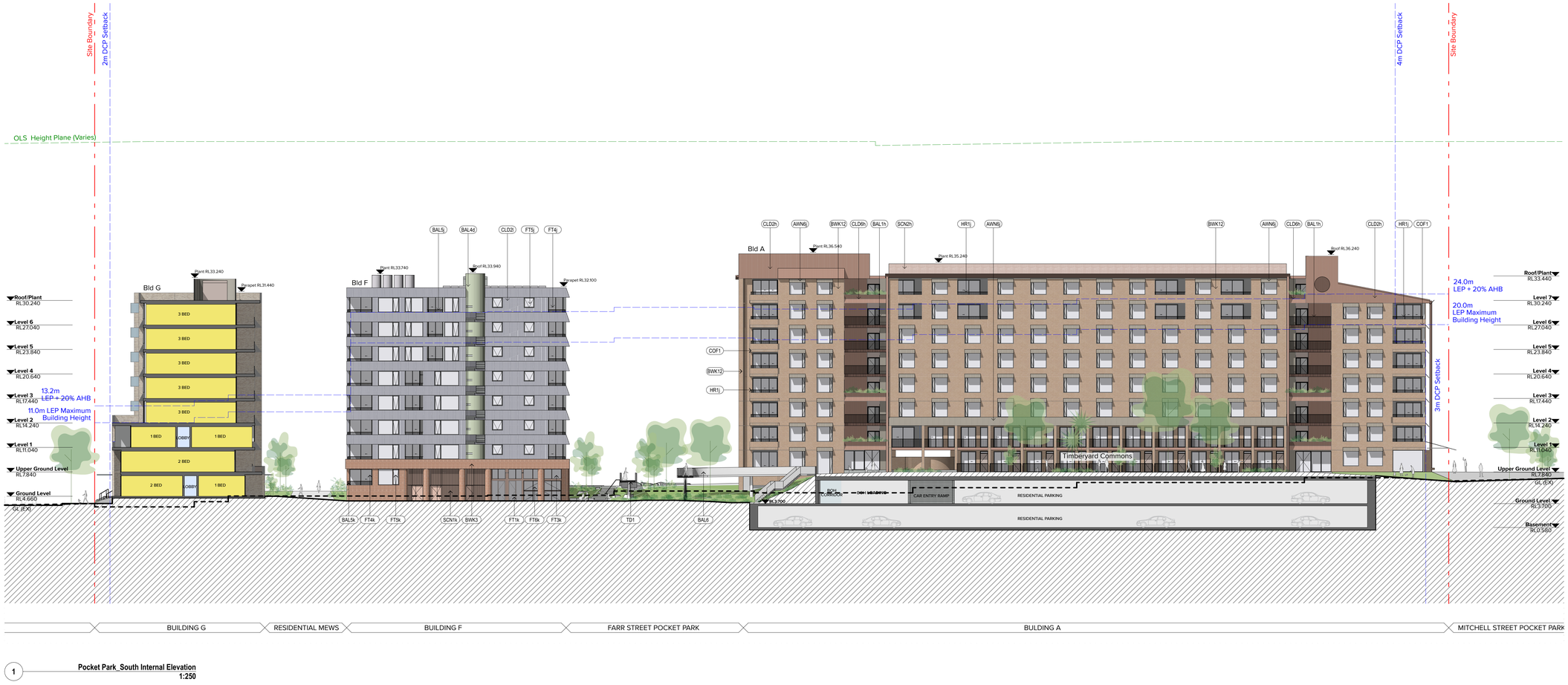
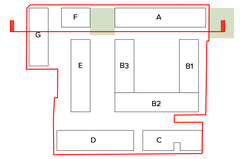
Nominated Architect Nicholas Turner 6600, ABN 86 064 084 911



1 **Pocket Park_South Internal Elevation**
1:250

Key Plan



Notes

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Rev	Date	Approved by	Change Note
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Collaborating Design Team

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Tribe Studio Architects Aileen Sage

MATTHEW PULLINGER ARCHITECT

ARCADIA

YERRABINGIN

Project Manager

neoscape

Client

RTL Co

Project Title

The Timberyards by RTL Co.

Lots bound by Victoria Road, Sydenham Road, Farr Street and Mitchell Street, Marrickville NSW 2204

Drawing Title

Internal Elevations
Pocket Park_South East Elevation

Status	Project No.	Rev
For SSDA Submission	23068	1

Scale **1:250 @ B1**

Dwg No. DA-220-501

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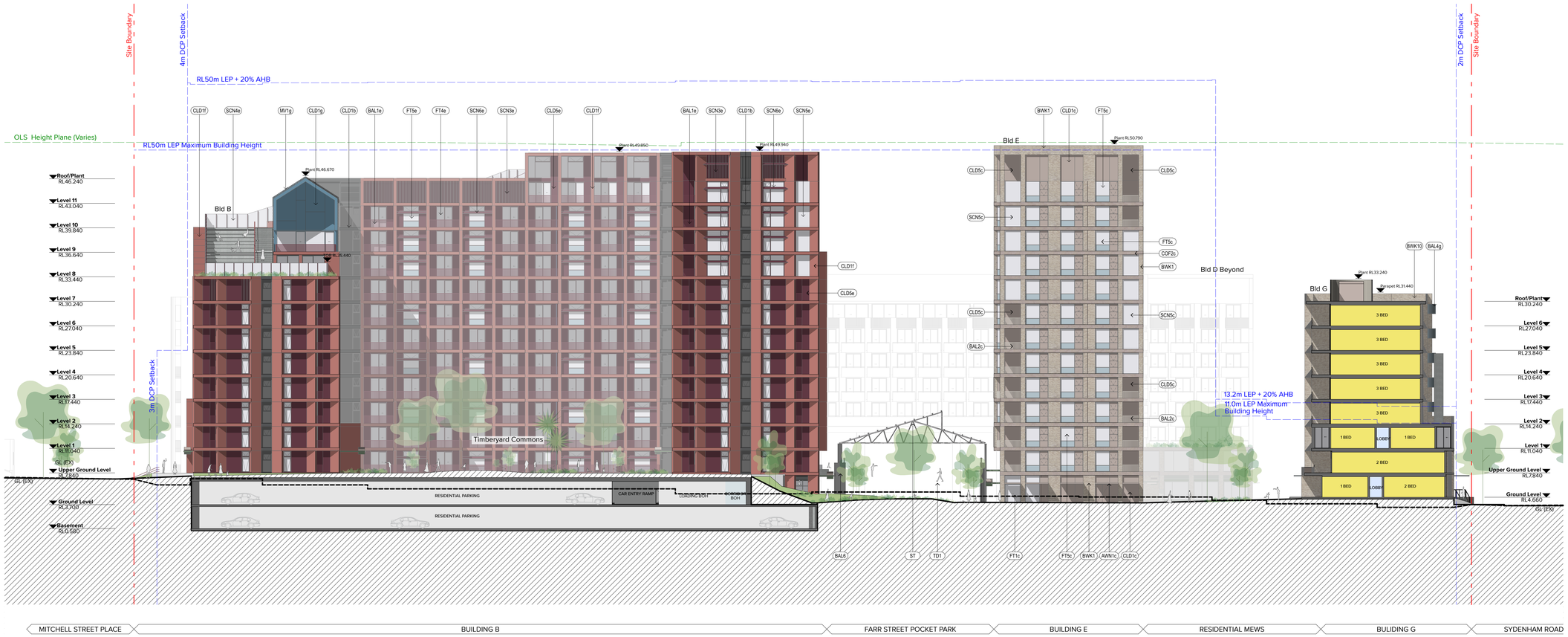
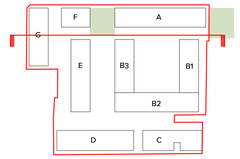
Nominated Architect: Nicholas Turner 9600, ABN 86 064 084 911



1 **Pocket Park_North West Elevation**
1:250

Key Plan



Notes

Refer to Precinct Material & Finishes Board drawing DA-890-001 for codes and definitions.

Rev	Date	Approved by	Change Note
1	12.12.24	DS	For SSDA Submission

Collaborating Design Team

TURNER Architecture AND

Tribe Studio Architects Aileen Sage

MATTHEW PULLINGER ARCHITECT

ARCADIA

YERRABINGIN

Project Manager

neoscape

Client

RTL Co.

Project Title

The Timberyards by RTL Co.

Lots bound by Victoria Road, Sydenham Road, Farr Street and Mitchell Street, Marrickville NSW 2204

Drawing Title

Internal Elevations
Pocket Park_North West Elevation

Status	Project No.	Rev
For SSDA Submission	23068	1

Scale **1:250 @ B1**

Dwg No. DA-220-601

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DLCS Quality Endorsed Company ISO 9001:2015, Registration Number 20476
Nominated Architect: Nicholas Turner 9600, ABN 86 064 084 911

Appendix C – Example Soil Registers

Imported Material Register

Supplier	Date	Docter / Invoice	Product Type	Volume (m^3 or tonne)	Placement Location

WARATAH

Exported Water Material Register

Load	Date	Classification	Source Area	Corresponding Classification	Waste Facility	Receipt / Docket	Tracking Number	Tonnage

WARATAH